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ADMINISTRATION REPORT

OF THE

DIRECTOR OF AGRICULTURE,

FOR THE YEAR 1928.

TRINIDAD:
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1929.

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TRINIDAD AND TOBAGO.

Council Paper No. 73 of 1929.

DEPARTMENT OF AGRICULTURE.

Administration Report of the Director of Agriculture for the year 1928.

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REPORT ON THE DEPARTMENT OF AGRICULTURE, 1928.

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DEPARTMENT OF AGRICULTURE.

Administration Report of the Director of Agriculture for the year 1928.

Council Paper No. 73 of 1929. *M.P. No. 2840/1929.*

HONOURABLE COLONIAL SECRETARY (ACTING).

I have the honour to submit, for the information of His Excellency the Acting Governor, the report for 1928 on the Department of Agriculture.

GENERAL.

During 1928 the Department completed the first twenty years of its existence, having been founded on 1st November, 1908. As, in addition, this is the last annual report I shall write on the Department which I joined as Assistant Director in 1911, and of which I have been Director since 1917, it seems appropriate to review very briefly events during this period. Like some other Departments of Agriculture in the Empire, *e.g.*, Jamaica, British Guiana, Ceylon, &c., the Department traces its origin back to its Botanic Garden founded in 1818, which for many years did all the work of introducing new plants, testing them, and advising on their care. The need of chemical assistance led to co-operation with the Government Analyst and in 1908 a definite Department was formed by amalgamating the Government Botanical and Analytical departments, and the Government Farm which dates from 1879. There were also put under the Department, River Estate, 1,500 acres, acquired originally as a water pumping station, and St. Augustine Estate, some 3,000 acres, bought to obtain a new site for the Farm. In addition there were a small Botanic Station and a Farm in Tobago.

From its origin the Department with the large properties of St. Augustine and River to administer has been in a different position from most Departments of Agriculture even now, and has had to face practical agricultural problems on an estate scale.

When the Department was formed in 1908 there was also created a Board of Agriculture, an executive body with its own funds raised by a special tax, which had control, under its own staff, of all work connected with diseases and pests, and also of agricultural education amongst the peasantry. This continued until 1920 when the Department was reorganized, all the work and staff put directly under it, and the Board of Agriculture changed to an advisory body.

From soon after the outbreak of the Great War the Department has experienced difficult times. During the war period it, not unnaturally, was understaffed. At the reorganization it was remodelled on a scale commensurate with the work to be done. The period of general trade depression followed very quickly ; some posts were abolished or not filled. Another disastrous result was that the new Head Office building, the necessity for which had been very great for some years, although started in 1921 was not completed, and for seven more years the accommodation has been absolutely inadequate. There came the Imperial College of Tropical Agriculture towards which the Colony gave large financial assistance (about 50 per cent. of the total contributed by all the Dominions and Colonies), and gave rise to a popular view that there was no need or both a College and a Department. The result was further reduction of staff, the Entomologist and even such an absolutely necessary officer as an Assistant Director being dispensed with. These circumstances, together with the inevitable increase in work as a country develops and new problems arise, have for a long time almost crippled the Department, and reduced its working capacity to a dangerously low level. It has pulled through as well as it could by the loyal co-operation of all the members of the staff whose devotion to their work, under very difficult conditions, I take this opportunity of putting on record.

Bearing in mind these facts I will indicate some of the results particularly of efforts made to effect financial economy. It has to be borne in mind in making comparisons between recent years and twenty years ago that salaries, wages and cost of materials are all higher now.

BOTANICAL DEPARTMENT.

For the first three complete years of the Department, *i.e.*, 1909-11, the average expenditure on this section was in round figures £3,774 and the revenue £287, making the annual cost £3,487.

For the last three years 1926-28, the corresponding figures have been £3,386, £1,493 and £1,843. That is to say an economy has been effected of £1,644 per annum, partly by a slight reduction in expenditure but mainly by larger earnings.

The earnings have been increased by producing nursery stock of a quality which planters can rely on. For the very moderate cost of a little over £1,800 per annum the planting community gets a dependable supply of planting material, the advice and assistance of members of the staff, notably Mr. Williams the Superintendent of the Gardens, to whom a very great part of the credit is due. In this cost are also included that of the maintenance of the Botanic Gardens, which are a recognized attraction to tourists and thus an asset to the Colony, the surroundings of Government House, the Red House, &c.

In Tobago there has been less scope for increasing revenue, but there the net cost of the Botanic Station and Government House grounds has been reduced from some £920 in 1909-11 to £530 in 1926-28.

The work of introduction and preliminary trials of new species and varieties of possible economic and ornamental value has been continued. Recent advances of importance to planters have been the successful budding on a large scale of cacao and avocados, and much attention has been given to the development of a grapefruit industry. The publication of " The Useful and Ornamental Plants of Trinidad and Tobago " was the outcome of work over several years by Mr. Williams and myself, and to Mr. Williams mainly is also due the credit of making a good start with the production of a Flora of the Colony, long required and particularly so now in relation to forestry and other economic questions.

THE GOVERNMENT FARMS.

The Trinidad Government Farm founded in 1879 has as its main objects the supplying of milk to Government institutions and the improvement of the live stock of the Colony. It was formerly a separate department but was merged in the new Department of Agriculture in 1908. At that period it was run at a heavy cost. For 1909-11 the average annual expenditure was approximately £4,075 and the revenue £2,095 leaving an annual deficit of £1,980. In 1924 a reorganization was effected and the Farm placed under the charge of Captain Metivier, the Government Veterinary Surgeon. A definite breeding policy was decided on and many changes made in practical working and the mode of handling and feeding the stock. The financial result is indicated by the fact that for the last three years, the average annual expenditure on the Farm has been £5,805, the revenue £7,216, leaving a profit of £1,411 per annum in place of a loss of £1,980, *i.e.*, a reduction in the cost of the Department of £3,391 a year.

The policy of breeding the Holstein to the Zebu to obtain an animal suitable for milk and draught has proved eminently successful, as also the efforts made to obtain a reliable supply of fodder throughout the year. The value to the Colony of the work done is shown by the recent establishment of commercial dairies in which the methods initiated at the Farm are being closely followed. During the last year or so the Farm has also been used, in co-operation with the Medical Department, as a place for educational demonstrations to the small dairymen who produce the greatest part of the milk used in Port-of-Spain.

To Captain Metivier in particular is due the credit for the valuable results which have been attained.

At the Tobago Farm there is, as at the Botanic Station, much less opportunity, but the net cost of the establishment for 1926-28 was only about £340 compared with £500 in 1909-11.

RIVER ESTATE.

This property, 1,500 acres, was acquired by the Government in 1897 for £4,629 to secure the water rights for a pumping station for Port-of-Spain. It was then an abandoned sugar estate, with some cacao. The Government leased it but in 1904 put it under the old Botanical Department. The cacao crop was then 182 bags (of 165 lb.). Merged in the Department of Agriculture in 1908 it was run on an advance account until 1920, and since then has been an ordinary section of the Department. As an estate River has paid its way, and put its profits into capital development. Its cacao crop is now over 1,300 bags, and with areas under cultivation in limes, coffee, tonka beans, citrus, and timber, the present value of the estate is about £35,000.

At River the Department has been able to accomplish a good deal of very useful research work on cacao. I have recently given a summary of this work in "Results of Cacao Research at River Estate, Trinidad" (*Tropical Agriculture*, VI. 1929, 127-33). A piece of pioneer work of fundamental importance is the establishment of the fact that there are naturally heavy and poor bearing trees, and that it is possible to select parents which transmit this characteristic to their progeny, either seedling or budded. This indicates an easily practicable method of increasing yield per acre, either in new plantings, or on existing estates by replacing poor bearers, commonly as high as 30 to 40 per cent. Other lines of investigation, effect of shade, improved cultural methods, planting distance, &c., have been pursued and useful results obtained.

The great value of River Estate, in addition to the new facts it has established, is that it serves as a practical demonstration on an estate scale of the application of methods recommended by the Department, and it is an encouragement to find that the more progressive planters are now, to an increasing extent, ready to adopt these methods.

At River much attention has also been given to improving the housing accommodation for labourers within practical limitations as to cost. This is of importance as with the steady advance in social conditions it cannot be expected that labourers will remain content with the accommodation provided on too many estates. It is a state of affairs not peculiar to Trinidad, and the Colony as other countries, must advance with the times.

The results obtained at River have been in great measure due to team work. Mr. J. C. Augustus, the first Manager, laid good foundations on which Mr. R. O'Connor, the present Manager, has continued to build still higher. The fundamental research work was largely due to Mr. J. de Verteuil; and Mr. L. Seheult, Cacao Agronomist, has during the last 14 years, by paying special attention to the problems of shade and cultural methods, obtained results which, put into practice, will be of great benefit to cacao planters all over the Colony.

ST. AUGUSTINE ESTATE.

This property, like River, an abandoned sugar estate, was purchased for about £9,000 in 1900 to secure a site out of town for the Government Farm then at St. Clair. It came under the Department in 1908 and was worked on its own bank account. Some £11,000 was spent in development, making roads, bridges, &c., village lots were laid out and rented. Other areas were sold for residential and agricultural purposes. The old machinery, &c., was also sold. On the reorganization of the Department in 1920 the estate was broken up. The Department retained the Farm (346 acres) and St. Augustine Experiment Station (140 acres) also two public pastures (154 acres), one since presented to the Imperial College and the other sold to the Cotton Research Station. Other unsold lands were handed over to the Crown Lands Department. The net financial result was very profitable to the Government. By 1920 the Department had repaid the original cost, and also deposited over £12,000 profits in the Treasury, and at the reorganization there remained in lands and houses, &c. (including the Farm, Experimental Station and pastures) property of the then estimated value of some £33,000.

Particulars were given in the *Annual Report* for 1919-1920.

ST. AUGUSTINE EXPERIMENT STATION.

The Board of Agriculture had for some years done some sugar work in lands of St. Augustine estate. In 1917 on the initiative of the Governor (Sir John Chancellor) and with the approval of the Board it was decided to raise seedling canes in Trinidad. This work was started then, and in 1920 a definite Experiment Station was formed.

This has proved a valuable place for work on sugar cane and associated crops, and also for fruit, &c., under conditions typical of the central plain and very different from River, the only other area under the Department where work can be done on an estate scale.

Its primary task at first was to breed a cane better than B.156 then the standard cane. This has been done, but the subsequent arrival of B.H.10 (12) the best cane ever produced in Barbados has caused these canes to receive less attention than they would doubtless otherwise have obtained.

Other work on grapefruit, pineapples, cover crops, &c., has yielded results of value under the charge of Mr. L. A. Brunton who has been throughout a most conscientious and painstaking manager.

CHEMICAL DIVISION.

Mr. J. de Verteuil the Agricultural Chemist has done all the sugar work in a little improvised and inconvenient laboratory at the Government Farm. His would-be usefulness in other directions has been largely reduced by never having been furnished with proper working accommodation owing to the non-completion of the Head Office building.

PLANT DISEASES AND PESTS.

From 1908-1920 this work was under the control of the Board of Agriculture, but came under the Department on the reorganization in 1920. Some scientific results of economic value have been achieved. Mr. J. B. Rorer established, for the first time, the fact that cacao canker and black pod were due to the same fungus. Mr. W. Nowell, who had discussed the actual cause of Red Ring disease of coconuts shortly before his appointment, continued his investigations and indicated practical preventative methods which, when adopted, have saved the lives of very large numbers of trees. In co-operation with Mr. F. Stell the present Mycologist much progress was made in clearing up the old comparison between real bud rot and secondary bud rot, sometimes due to red ring and at other times to coconut wilt which is related with unfavourable soil conditions. A simple cure was also found for " Little Leaf " disease. Mr. Nowell's book on " Diseases of Crop Plants in the Lesser Antilles " completed whilst in the Department and now recognized as a standard text book, clearly distinguished between specific diseases and troubles due to debility and unfavourable conditions. The record of scientific work and output is one of which a much larger and better equipped department might be proud, especially when it is remembered that the staff has never had the advantage of being research officers, but rather general practitioners whose time has been mostly occupied in advising planters and administrative duties. Yet, although its work is of such primary importance, this is the section of the Department which has been most subject to popular criticism and has suffered the greatest enforced reduction.

From 1911 Plant Protection work, on a much higher basis than hitherto, has been practised, and from a little later date great assistance given to all classes of cultivators by the Department undertaking the task of destroying parasol ants in Crown Lands.

AGRICULTURAL EDUCATION.

The Board of Agriculture had first two and later three Agricultural Advisers working amongst the peasantry. On the fusion with the Department in 1920 the number was increased to seven, and the duties of supervising school gardens added. These officers have given very valuable assistance to the smaller cultivators by practical advice on their holdings in helping to control diseases and pests, and recently by inspection work in connection with the Government Agricultural Bank.

AGRICULTURAL CO-OPERATION.

During 1913-15 I spent much time in endeavouring to introduce co-operative agricultural credit, with great personal help from the Governor, Sir George Le Hunte, who attended meetings as far away as Mayaro and Princes Town. An Ordinance was passed in 1915 and the first society founded the following year. There are now thirty-six ; one-third composed of small proprietors, mostly cacao, in Tobago, and the rest, mostly cane farmers, in Trinidad, and almost all on the estates of the Ste. Madeleine Sugar Co. with whom the work of Mr. G. A. Jones, of the company's staff, has been invaluable. It is a pity that more sugar estates have not taken a practical interest in the movement as through such societies many of the troubles of the cane farming industry can be eased.

Many of the societies were founded in the short lived trade boom after the war when prices of staple products were high, and had difficult times in the prolonged period of depression which so soon followed. The majority have pulled through in a way which augurs well for the stability of the movement. This is particularly the case in Tobago where the societies have not had the advantage of a large and sympathetic company behind them. In Tobago fresh ground has been broken by the foundation last year of a co-operative cacao fermentory, and others will doubtless follow. Much of the success in Tobago has been due to the zeal and hard work, over many years, of Mr. F. D. Davies the Agricultural Adviser who in a recent report says :—

" All doubtful or bad debts have been written off by all but two of the Societies. It is interesting to note that during the period of high prices for produce—1920—the savings deposits of members of nine societies reached £444. 1s. 6d. In 1921 and 1922 Tobago suffered from storm damage which affected the cacao crops for about four years and along with this reduction was the further drawback of low prices ; Societies had great difficulties in meeting their liabilities, but at present all but two have made good. The overdue liabilities of these two Societies amount to slightly over £200.

" The value of Credit Societies cannot be judged from their lending capacity alone ; they are also of very great educational value. Selfishness and petty jealousies among individuals are disappearing. The obligation of repayment of loans ; the exchange of ideas, field inspections, agricultural lectures by officers of the Department, and healthy rivalry have gone far to impart a sense of responsibility and thrift and so broaden the horizon of their ambition.

" The real proof of the value of these societies to the members must come from themselves, and if such is needed, in face of their development and spread, one has but to look at the numerous votes of thanks recorded in their minutes to Inspectors and other officers who have assisted the cause, especially the Registrar—who has been greeted as the peasants' friend and likened to Moses releasing the Israelites from bondage, and administering to their hunger and thirst in the wilderness of a peasant's toil—and see that these are not vain words of thanks emanating from shallow thoughts in 13 villages.

" The success of the Credit Societies in Tobago is due largely to the Inspectors, especially Messrs. J. E. Seheult and M. Dhein, who have had many a weary night in writing up and checking accounts. Prior to 1924, the accounts were a serious proposition until Mr. Dhein recommended that they be centralized. They have been kept at my office up to the present time. This has been a laborious task, done single-handed, without the aid of a clerk and chiefly at night."

Mr. K. Walter, Secretary of the Horace Plunkett Foundation, after his recent tour, expressed the opinion that Tobago stood unique amongst the West Indian Islands he had visited in having laid sound foundations for the development of agricultural co-operation.

It is hoped this will continue to the further benefit of the peasantry and the general prosperity of Tobago, and also that there may be in the near future a marked extension of the movement in Trinidad.

PRINCIPAL CROPS.

The quantities and values of the chief agricultural exports during 1928 are given in Table II (p. 55). The following summary gives comparative figures for the last five years of the three staples on which the welfare of the Colony so largely depends.

	Cacao.		Sugar (1)		Coconuts (2)	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	lb.	£	Tons.	£	No.	£
1924	56,402,755	1,165,816	43,423	1,321,417	45,351,339	222,764
1925	47,476,609	1,257,255	60,648	1,203,203	41,964,788	192,830
1926	50,067,881	1,270,335	65,680	1,109,408	50,343,619	206,771
1927	51,934,857	1,671,883	41,805	864,562	46,573,459	170,295
1928	58,008,156	1,651,179	74,112	1,201,477	73,793,060	274,239

(1) The quantity of sugar exported is given, but under values those of the by-products of sugar exported are included, viz.: rum, molasses and bitters.

(2) Coconuts are exported as whole nuts, copra and oil. To obtain comparative figures of annual crops 1 lb. of copra is taken as equivalent to 3 nuts, and 1 gallon of oil to 45 nuts.

The climatic conditions of 1928 were fairly normal, but the agricultural results were affected by the exceptional conditions of the two preceding years. 1926 was marked by a very severe dry season followed by unusually heavy rains. In the early months of 1927 (normally the dry season) the rainfall was high and the wet season was normal, so that, from the middle of 1926, there was some eighteen months of continuous wet weather. The effects are referred to under the chief crops affected, cacao, sugar, and coconuts.

Cacao.—During 1927 and 1928 cacao made a good recovery from the effects of the drought of 1926, which had resulted in great damage in certain localities not only due to actual lack of rain, but also indirectly to creating favourable conditions for the cacao beetle (*Steirastoma depressum*).

The Government continued the special Cacao Beetle Campaign, with twelve inspectors under a Supervisor, with good results, many proprietors doing much more work than hitherto in controlling the pest. Better prices, at any rate in the early part of the year, also encouraged more activity, and the cacao crop exceeded that of the previous year by approximately 6,000,000 lb. and was the largest since 1923.

The replacement of cacao by sugar cane, in districts not well suited to cacao, continues, and as pointed out previously a return to the high production of 1921 and 1923 depends mainly on more general adoption of improved methods of cultivation, and more attention to plant sanitation.

That such improved yields from the same acreage are practicable has been demonstrated by the work at River Estate. Here, as the outcome of nearly twenty years investigations and practical tests on a large scale under estate conditions, it has been shown that cacao trees vary naturally in their yield, that heavy bearing strains can be selected and propagated, and that these good bearers can be used with great benefit to replace the poor bearers which are found in large numbers on all estates. Cultural work, the regulation of shade, &c., at River Estate has also shown that some of the diseases and pests which cause most loss of crop are also controllable. With a permanent crop such as cacao, such work is slow, but now that the Department has been able to put forward definite results there are encouraging indications that the methods recommended are being adopted to an increasing extent, and it is hoped material benefit will follow.

On the other hand it is very unfortunate to have to report the occurrence of Witch-Broom Disease of Cacao in Trinidad (*see* also p. 49). The disease, due to a fungus (*Marasmius perniciosus*), has in the past done much harm in Surinam, Ecuador and to a less degree in British Guiana. Early in the year its presence was reported in one of the wettest districts of Trinidad. An active campaign of control was conducted by the Government. Illustrated publications were widely distributed and the control work carried on by a special staff at Government expense on all the properties of small proprietors affected. In December, Dr. Stahel, Director of Agriculture of Surinam, and the recognised authority on the disease, visited the Colony through the great courtesy of the Governor of that Colony. He made a careful survey of the affected areas, and in a report has expressed his entire approval of the methods of control adopted by the Department of Agriculture. Dr. Stahel anticipates that the disease will spread but that provided proper care and attention is given by all concerned it can, at a very moderate cost, be prevented from doing serious damage.

Sugar.—In 1926 the Colony made the largest sugar crop hitherto recorded, 73,561 tons, in spite of a severe attack of the Froghopper pest (*Tomaspis saccharina*) to which the severe dry season was very favourable. In 1927 weather conditions were unfavourable to the Froghopper but the heavy rains during the "dry" season not only caused the sucrose contents of the canes to be low, but so hampered field operations that some 70,000 tons of cane remained uncut. As a result the crop fell to 51,982 tons. In 1928 Froghopper attack was, in general, but slight, and helped by the canes which stood over from 1927 the crop reached the new record of 81,551 tons.

There was every indication then of still further increase in this crop, but the subsequent fall in the price of sugar and the general outlook is making the position of the industry very precarious and a cause of great anxiety.

Improvements continue to be made in estate cultural work, mechanical tillage now playing a very important part.

The Froghopper Investigation Committee has actively pursued its work. The breeding and testing of Trinidad seedling canes has been continued with promising results.

The following tables give the total production of sugar, the relative proportion from estate and farmers' canes, and the exports for the last five years :—

Year.	*Sugar made from Estate Canes.*	*Sugar made from Farmers' Canes.*	*Total.*
	Tons.	Tons.	Tons.
1928	45,251	36,300	81,551
1927	28,001	23,981	51,982
1926	39,489	34,072	73,561
1925	38,993	30,636	69,629
1924	30,862	10,757	41,619

The exports for the last five years have been :—

	1924.	**1925.**	**1926.**	**1927.**	**1928.**
Grey Crystal—tons ..	25,418	30,913	57,626	28,315	57,254
White Crystal—tons ..	3,222	2	3	3	..
Yellow Crystal—tons ..	13,478	25,751	6,138	12,814	15,397
Molasses Crystal—tons ..	1,461	2,886	1,411	570	1,315
Muscovado Sugar—tons	107	747	502	162	146
Refined—tons ..	737	349	250	..	..
Molasses—gallons ..	1,505,881	1,271,050	1,427,274	1,188,840	1,622,018
Rum—gallons ..	82,571	28,474	71,213	35,699	55,088
Bitters—gallons ..	44,569	58,336	56,599	55,152	49,236

			Values.		
	1924.	**1925.**	**1926.**	**1927.**	**1928.**
Grey Crystal	£598,373	£454,396	£871,156	£514,946	£889,116
White Crystal	77,816	80	54	58	8
Yellow Crystal ..	488,552	567,192	107,186	235,840	291,980
Molasses Crystal ..	43,768	51,750	17,872	9,972	18,211
Muscovado Sugar ..	2,763	11,786	6,960	1,548	2,162
Refined	22,672	7,307	2	..	..
Molasses	24,843	29,639	14,330	14,471	16,013
Rum	18,063	5,319	10,933	8,155	12,157
Bitters	44,567	75,734	80,915	79,570	70,101

COCONUTS.—This industry continues to expand. In 1927 there was a drop in exports attributed to the drought of 1926, the effects on the coconut palm being far reaching. In 1928, with the long preceding spell of favourable conditions, there was a noteworthy increase resulting in a record export equivalent to approximately 74,000,000, over 50 per cent. above that of 1927.

The trade is in whole nuts, largely to the United States for confectionery purposes, the demand for which has declined greatly since the war; in copra, the dried kernel; and in coconut oil. Copra is now by far the most important, but the export of oil is increasing.

The exports of the three products for 1928 were:—

Coconuts	6,799,655 nuts.
Copra	21,351,860 lb.
Oil	65,285 gallons.

To indicate the total output in comparison with other years, it is necessary to reduce copra and oil to their equivalents as nuts. Taking 1 lb. of copra as equal to three nuts, and one gallon of oil as equal to 45 nuts the total exports for the last five years have been:—

	Nuts.	*Value.*
1928	73,793,060	£274,239
1927	46,573,459	109,295
1926	50,343,619	206,771
1925	41,964,788	192,830
1924	45,351,339	222,764

There is also a large local consumption of nuts and oil.

It is probable that for 1928 the number of nuts is slightly exaggerated, as owing to the favourable rainfall, the proportion of large nuts was higher, and consequently it took rather less than three to give one pound of copra.

Improvements are being made in preparing the copra, and artificial drying is more commonly practised. More attention is being paid to the control of Red Ring disease, which is due to a nematode worm. Cure of an affected tree is not practicable but, by adoption of the preventive measures which have been advocated by the Department for several years, the incidence of the disease can be minimized. The other main trouble, Coconut Wilt, is, as previously reported, associated with unfavourable soil conditions. Increasing attention is being given to proper cultural and sanitary measures with good results, although in too many instances coconuts are still apparently regarded as a crop which can be grown without any care on land the outstanding characteristic of which is that it is unsuitable for any other crop.

COFFEE.—Planting of this crop continues, the varieties grown being chiefly *Coffea arabica*, *C. robusta* and *C. excelsa*. Recently *C. canephora* has been introduced, has fruited and looks very promising.

The main hindrance to a more rapid development is the common, but not universal, practice of puttng coffee in odd places through established cacao, giving it no proper care and attention, with the result that it bears very little. Climatic conditions during the last three years have been generally unfavourable to coffee, and so although the crop of 1928 showed an advance of over 50 per cent. on that of 1927 it was less than 50 per cent. of the crop of 1925.

The exports for the last five years were :—

	Quantity.	*Value.*
1928	264,918 lb.	£10,869
1927	163,920 ,,	7,238
1926	497,688 ,,	20,371
1925	597,722 ,,	28,202
1924	518,076 ,,	15,873

Fruit.—Attention continues to be concentrated on the practicability of building up an export trade in Citrus fruit, principally grape fruit. Since the importation of standard commercial varieties of grape fruit in 1914, the Department of Agriculture has propagated and sold increasingly large numbers of budded plants. There are now in the Colony some 35 acres of bearing trees, 168 acres of non-bearing trees, and extension in view of some 400 more acres.

During the year the Colony was visited by Prof. Clark-Powell in the course of a world tour for the Empire Marketing Board. He made a careful inspection of the areas already planted and of the Colony generally and expressed the opinion that climatic and soil conditions in Trinidad were very favourable to grape fruit culture. Prof. Powell, both in meeting the planters and in his published report (*Grape Fruit Culture in the West Indies and British Honduras*, Empire Marketing Board, No. 13)., gave valuable advice and indicated the action to be taken for the successful development of the industry.

On his recommendation Mr. R. O. Williams, Superintendent of the Royal Botanic Gardens, left late in December for a tour in the grape fruit districts of Florida and Porto Rico.

The season of 1928 was a poor one for citrus generally and there were only some small exports of grape fruit, and the usual trade in oranges to Barbados.

The figures for the last five years are :—

	Quantity.	*Value.*
1928	..	£1,357
1927	..	4,539
1926	1,273,090 No.	1,749
1925	1,388,674 ,,	1,636
1924	1,313,436 ,,	1,341

Food Crops.—Considerable quantities of rice, corn (maize), yams, sweet potatoes, cassava, pigeon peas (Cajanus), tannias, bananas and plantains, &c., are produced for local consumption. To assist in the marketing of some of these products—known as ground provisions—the Government has maintained since 1917 a Government Provision Depot, started as a War measure, and continued as a part of the Department of Agriculture. It has done useful work, and is self-supporting. A Fruit Depot was subsequently added.

AGRICULTURAL PROGRESS OF TOBAGO.

Tobago is a ward of Trinidad and its exports out of the Colony all pass through Trinidad and are included in the general statistics of the Colony. It has also a considerable trade in minor products, vegetables, livestock, &c., with Trinidad itself. The total value of the Tobago trade in 1928 was £168,405.

The great progress made by Tobago in the last thirty-one years is shown below :—

	1897.	**1928.**
Cacao	1,671	114,347
Sugar and Molasses	4,120	93
Coconuts, Copra and Oil ..	776	27,377
Vegetables and Fruit	151	7,589
Rubber	..	..
Tobacco	..	4,490
Live stock	7,694	14,509
	£14,412	£168,405

The Cacao Crop in 1928 was 4,573,860 lb. and the Coconut Crop 240,600 nuts, and 3,198,610 lb. of copra, equivalent to a total of 9,836,430 nuts.

AGRICULTURAL BANK.

The Agricultural Bank established by the Government in 1925 had by the close of 1928 advanced £164,406. 5s. 0d. as loans on 265 properties. These loans are all secured by first mortgages, and are repayable over a period of 30 years. In addition £3,604. 15s. 10d. was lent during the year as temporary advances, usually repayable within one year. The Bank is able to assist both large and small cultivators, as shown by the fact that to the 1928 loans no less than 177 were made on properties of not more than 50 acres in area.

The properties on which loans are made are inspected regularly by Officers of the Department of Agriculture and steps taken to ensure that where necessary, efforts are made to remedy any cultural defects. The Bank is thus also doing very useful work in advancing practical agricultural education.

BOTANICAL DEPARTMENT.

Mr. R. O. Williams, Superintendent, Royal Botanic Gardens and Assistant Botanist, reports as follows :—

Government House Grounds.

The prison gang was again much below its authorised strength and at times there was difficulty in keeping the grounds in proper condition. A small plot of Citrus and Avocado trees was planted in the dell north-east of the Guard House.

Royal Botanic Gardens.

After an unusually wet year in 1927 the weather returned to normal. The trees, shrubs and other plants mostly kept in good condition, and the lawns were not attacked by mole crickets.

The following plants were put into permanent positions :—*Diospyros mollis*, *Hydnocarpus ilicifolia*, *Triplaris surinamensis*, *Albizzia lebbekoides*, *A. moluccana*, *A. saponaria*, *Cocos campestris* and *Washingtonia Sonorae*.

A young tree of *Hydnocarpus Wightiana*, planted in 1926, flowered during the year.

The shelter on the Look-out hill was repaired and painted by the Public Works Department.

St. Clair Experiment Station.

The work of this station has continued to develop mostly as a nursery business and an increasing demand for Citrus plants taxes its resources to the utmost. The output of this class of plant, which calls for much supervision, increased from 4,685 in 1927 to 8,858 in 1928. Persons developing their own nurseries also largely make use of the staff and labour of the Department. Apart from local sales St. Clair has functioned now for some years as a West Indian Nursery for many kinds of budded and grafted plants, and frequent are the requests from other islands.

The total number of plants sent out was 139,927, compared with 151,317 in 1927 and 123,482 in 1926. The decrease from 1927 is largely accounted for by the output of cacao plants dropping from 73,745 to 49,135. Coffee distribution, however, increased from 51,258 to 63,407. Revenue from the sale of same amounted to £1,408. 0s. 5d.

A detailed list of plants, seeds, cuttings, &c., distributed is given below :—

CACAO.		
Seedlings	48,945	
Budded	190	
		49,135
COFFEE.		
Robusta	45,604	
Excelsa	15,471	
Arabica	1,302	
Canephora	1,030	
		63,407
FRUIT.		
Oranges &c. (budded)	1,732	
Grape Fruit Marsh (budded)	6,325	
Grape Fruit Assorted (budded)	801	
		8,858
Mangos (grafted)	944	
Avocados (budded)	238	
Limes	5,959	
Pineapples	24	
Miscellaneous	1,307	
Bananas	971	
		9,443
TIMBER TREES		807
OTHER ECONOMIC PLANTS		798
DECORATIVE PLANTS		7,479
Total number of plants		139,927
BUDWOOD		2,150 pieces.
CUTTINGS		24,719
SEEDS.		
Coffee		69 lb.
Miscellaneous		207 pkts.
SEEDS. (Countable).		
Mahogany	39,500	
Miscellaneous	36,202	
		75,702
MISCELLANEOUS.		
Fruit		1,170
Other produce		41 lb.
Soil and Turf		45 loads.
Budding Tape		152 yards.

To provide room for Citrus nursery extension the plot south of the nursery sheds was cleared and planted with sour orange stocks.

Mr. A. Abrahams, the Assistant Superintendent of the Botanic Gardens, British Guiana, spent a fortnight at St. Clair for the purpose of studying the budding of Citrus.

A stock of plants of several members of the *Sterculiaceae* were raised for the Mycologist for the purpose of Witch Broom investigation.

LIME BREEDING.—This work, commenced in 1925, was continued. A study of the original hybrids was made, photographs taken, and a paper prepared. Professor Hardy most kindly examined fruits of the resistant kinds for citric acid, oil, and other characters. Back crosses were made both ways between the resistant hybrids and their female parent, viz. : the West Indian Lime, during the month of June.

Budded stock of the resistant hybrids from the original cross were planted in a plot at the south-western end of the station.

CHAULMOOGRA OIL PLANTS.—*Oncoba echinata* produced one fruit for the first time at St. Clair and plants were raised from it.

MOSQUITO CONTROL.—The close vicinity of the station to Port-of-Spain calls for constant vigilance regarding mosquito and fly control. This work was done regularly.

TREES ON GOVERNMENT LANDS.

These were attended to as usual on the lands under the control of the Agricultural Department. The principal loss was a fine specimen of *Enterolobium cyclocarpum* near the race stand.

Trees on the following lands under the control of the Public Works Department were also attended to :—

St. Ann's Asylum, Hospital Gardens, Tranquillity School, Public Works Department Office ground, Queen's Royal College, Powder Magazine, and Belmont Police Station.

General.

The first edition of *The Useful and Ornamental Plants of Trinidad and Tobago*, by W. G. Freeman and R. O. Williams (1927) was exhausted during the year, and a new and revised edition prepared and published ; price 2s. 6d.

GRAPE FRUIT.—Professor Clark Powell visited Trinidad between 4th and 27th June at the instance of the Empire Marketing Board to report on grape fruit cultivation. He was taken about, both Trinidad and Tobago, by the Director and the Superintendent of the Botanic Gardens. Prior to his visit a survey of the grape fruit industry was made for the purpose of furnishing him with the necessary data.

TOBAGO.—A visit was paid in December.

GRENADA.—Three visits were paid by the Superintendent, viz. : 30th March to 13th April, 4th July to 12th July, and 21st July to 10th August. The second visit was for the purpose of meeting Professor Clark-Powell, but owing to his being taken ill in St. Lucia it was necessary for the Superintendent to make a third visit.

SCHOOL GARDENS.—The final judging in this competition was done as usual, about 40 schools being visited. The Agricultural Medal was awarded to the Tacarigua C.M. School. Visits were also paid to school gardens with the Assistant Director of Education, and with the late Mr. J. R. Bovell.

FIELD DEMONSTRATION AND MEETINGS.—A lecture was given by the Superintendent to the Tacarigua Agricultural Society on Agricultural Shows. The following meetings were also attended :—

Agricultural Show Committee, Agricultural Society, and Fruit Growers' Association meetings.

Students of the Imperial College of Tropical Agriculture spent two mornings at St. Clair studying propagation methods, &c. Botanical specimens for class work were supplied as usual.

The Curator gave several field demonstrations to the girls of St. Hilary's High School and one to the Tacarigua District Agricultural Society.

Herbarium.

The herbarium and botanical library was moved from the ground floor to the first floor of the new office.

A total of 193 sheets were collected during the year and about 206 systematically arranged in the cabinets. Where possible, duplicates of these have been sent to Kew and the New York Botanical Gardens. The Directors of these establishments have also kindly assisted with identifications of plants.

Botanical collecting was undertaken in the following districts :—

Aripo, Irois, Cedros, Sangre Grande, Plum Road, Nariva, La Brea, Princes Town, Quinam Reserve, Fyzabad, Morne L'Enfer, Morne Diablo, Siparia, Palo Seco, Erin, Maracas, St. Augustine, Diego Martin, Maraval, Carenage, Chacachacare, vicinity of Port-of-Spain, and Tobago.

The Venerable Archdeacon Hombersley, who has given considerable help with the fern collection for some years past, kindly commenced the task of systematically going through and rearranging the specimens.

FLORA OF TRINIDAD AND TOBAGO.

The work of compiling the flora has continued as time and opportunity permitted. A subsidy of £100 was given to Kew by the Government for the purpose of critically reviewing the MS. before printing.

The first two parts of the flora covering the cohorts *Ranales* and *Rubiales* were printed by the Government Printer, and put on sale at a price of 1s. and 2s. respectively.

The MS. of the following cohorts was prepared:—*Guttiferales*, *Malvales* (in part), *Geraniales*, *Olacales*, *Celastrales*, *Sapindales* and *Rosales* (in part).

The herbarium has been made use of for study purposes by the various colleges, and identifications of plants have been made for the Imperial College of Tropical Agriculture, the Forestry Department, &c.

A collection of Melastomads was also identified for Mr. Taylor, a Government Officer from Fiji who was taking a course at the Imperial College. For this work the Superintendent received the thanks of the Fiji Government.

BOTANIC STATION, TOBAGO.

The Julie mango plot planted in 1925 is now in good condition. The situation on the hillsides seems well adapted to them. The pine apples are giving fair returns. The Marsh grape fruit planted on part of the old cacao plot, on low lying lands, shows great promise. The trees are well grown for their age.

The cacao plots were cutlassed and mulched during the year. Next year trenching work will be carried out on the lines of River Estate. Additions will be made to this plot by planting " River " heavy bearers Nos. 407 and 969. Seeds from these trees have been sown in the nursery.

The routine work of cutlassing and clearing drains has been carried out and the general appearance of the station is good.

Government House Grounds.—The general appearance of the garden has been much improved during the year. Special attention has been paid to the spacing of the rose trees and flowering plants. The lawns have been cutlassed, scythed low and then kept in order with a lawn mower.

The bush around the house has been cleared, care being taken to remove all wild pines from the large trees. All holes likely to collect water were filled up.

Expenditure.

	£	s.	d.
Personal Emoluments ..	310	0	0
Wages of Extra Employees—			
Botanic Station ..	224	12	0
Government House Grounds ..	54	18	9
Travelling	21	5	0
Materials:			
Botanic Station ..	21	18	7
Government House Grounds ..	3	4	0
Total	£635	18	4

Revenue.

	£	s.	d.
Cacao plants	13	7	3
Coffee plants	6	8	7½
Mango plants	6	10	0
Assorted plants	15	12	6
Citrus plants	1	2	0
Fruits	8	11	3
Coconuts	2	16	1
Miscellaneous	14	3	3½
Total ..	£ 68	11	0

ST. AUGUSTINE EXPERIMENT STATION.

The following information is summarized from a detailed report by Mr. L. A. Brunton, the Manager:—

The principal work of this station continues to be the raising of seedling canes together with comparative tests of new varieties of cane imported from other countries. Attention is also given to problems in connection with cane cultivation, particularly the use of cover crops, for which purpose trials of many varieties of plants chiefly leguminous, are being made. In addition a few other crops of economic value are under trial.

Sugar Cane.—Average Yield.

The yield from 60·92 acres was 1,436 tons 9 cwt. 3 qrs. The general average was 23·64 tons per acre; plant canes 37·6: 1st ratoons 19·6: 2nd ratoons 14·6, and 3rd ratoons 12·4 tons.

The highest yield, 41·17 tons per acre, was obtained from 8·85 acres divided into 153 plots varying from approximately 1/66 to 1/8 of an acre. The individual cane which gave the highest yield was a new Trinidad seedling of the 1924 series, T. 3002 with 128·7 tons per acre from a plot of approximately 1/98 of an acre, seventeen other canes of this series gave varying yields from 71·7 to 86·6 tons to the acre from plots of the same size, and the three standards B.H. 10 (12), B. 156 and Ba. 6032 planted in the same field in plots of approximately 1/99 acre yielded 74·25, 58·16 and 47·02 tons respectively. Of the older seedlings, raised in 1921, the highest yield was obtained from T. 1903 followed by T. 2302 and T. 2047 with 62·7, 61·87 and 60·32 tons per acre respectively from plots of 1/22 of an acre.

Cultivation Experiments.

FROGHOPPER EXPERIMENT :—The severe attack of 1927, which culminated by spreading throughout the field, had a marked effect on the 3rd ratoon crop. The attack continued this year and spread to the fields North and East.

This experiment started in 1924, to determine the effect of yearly applications of nitrogenous fertilizers on froghopper attacks, was brought to a close this year. The results appear to indicate that froghopper attacks increase in severity when nitrogenous fertilizers are continually applied year by year. Nitrate of soda seems to produce this effect more rapidly than sulphate of ammonia, since, in all but one of the four years during which the test was carried out, the control plot yielded from $\frac{1}{2}$ to nearly 4 tons more than the fertilized plot, while only in the last year did the sulphate of ammonia plot yield less than its control.

DRAINING EXPERIMENT.—The 1927 froghopper attack which spread from the froghopper experiment plots to the drained portion in this experiment affected the canes to such an extent as to render comparison with the undrained portion valueless. The undrained portion, approximately three acres, yielded at the rate of 22·83 tons per acre, the drained portion, approximately $2\frac{2}{3}$ acres, yielding only 19·24 tons to the acre.

BANKING RATOON CANES.—A test was made on 3rd ratoon canes of the effect of banking up the stools by throwing the soil between the rows against the stools with a plough. Three varieties in plots of approximately a quarter acre each were so treated. Two varieties gave an increased yield of 3·25 and 0·26 tons per acre respectively while the yield of one decreased by 8·61 tons per acre under this method of cultivation.

DISTANCE PLANTING EXPERIMENT.—The results of this test with two varieties T. 608 and B.H. 10 (12) planted in four plots of approximately 1/8 of an acre each at 4 feet by 2 feet, 4 feet by 3 feet, 4 feet by 4 feet and 4 feet by 5 feet are conflicting, the yield from the 4 feet by 4 feet plot proved the highest with T. 608, but with B.H. 10 (12) the 4 feet by 2 feet plot gave the highest yield.

Manurial Experiments.

WHALE MEAL EXPERIMENT.—The third crop reaped, since the application of 300 lb. per acre of this fertilizer, still shows a slight increase ranging from 0·36 to 1·08 tons, in four out of the five varieties to which it was applied, the results of the remaining variety are unreliable due to an attack of froghopper.

GROUND LIMESTONE EXPERIMENT.—The yield from a field of 8·25 acres to which ground limestone, two tons per acre, had been applied in 1925, previous to seeding down to various cover crops followed the next year (1926) by sugar cane, amounted to 41·17 tons per acre, the previous plant crop reaped from this field in 1923 yielded 19·7 tons per acre a difference of 21·47 tons per acre which may reasonably be placed to the credit of the ground limestone and green dressing.

H.O.P. COMPOUND FISH MANURE EXPERIMENT.—The yield of the second crop from the two Trinidad seedlings, T. 301 and T. 650, to which this fertilizer had been applied in July, 1926, at the rate of 4 cwt. per acre, shows an increase of nearly three tons and just over two tons per acre respectively over their control plots.

ADCO EXPERIMENT.—The synthetic manure made with "Adco" in 1926, was applied at the rate of 15 tons to the acre in comparison with pen manure, to 24 varieties of cane divided into equal plots of approximately 1/20 acre each. The results show that 11 "Adco" plots gave higher yields ranging from 0·58 to 25·00 tons per acre than the corresponding pen manure plots, while 13 pen manure plots gave yields higher than their respective "Adco" plots varying from 1·07 to 32·34 tons per acre. There was considerable variation in the degree of decomposition of the "Adco" manure, it is probable therefore that had the "Adco" manure been more uniform the differences in yield would not have been so marked.

Ammophos Experiment.—At the end of June 1927 "Ammophos" was applied to two varieties, S.C.12/4 and Ba.11569, of plant cane at the rate of 250 lb. and 375 lb. per acre respectively, each variety was divided into six plots of approximately 1/50 acre, three of which had received an application of "Adco" and three of pen manure, "Ammophos" was applied to two plots in each series, to one of which 50 lb. of sulphate of potash was added, at the same time applications of 250 lb., 375 lb. and 500 lb. per acre respectively of this fertilizer were made to 1st ratoons of three Trinidad Seedling Canes T. 619, T. 637 and T. 914. The results show an increased yield in only two plots of one variety of plant canes, but an increase of 7·92 and 6·93 tons per acre respectively in two out of three ratoon canes.

New Trinidad Seedlings.

Four thousand five hundred and thirty-six seedlings raised in 1927 were planted out during March and April. Seed was collected from twenty-two varieties, eight of which were received from various estates. Germination was exceedingly poor, only nine varieties having germinated, three of which were from this station. By the end of the year the number of plantlets pricked off amounted to only 900 out of which 240 and 480 respectively were raised from B.H.10 (12) and Ba.11569.

Selection on field character and chemical test of seedlings previously raised resulted in 2, 6, 3, 17, 23, 7, 39, 159, 81, of the seedlings raised respectively in 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924 and 1925 being retained for further trial, in addition a first selection of 226 was made from seedlings raised in 1926. The number of sugar cane samples sent to the Agricultural Chemist to be tested amounted to 1,796. No new selections for trial by Sugar Estates were made this year. Visits were paid to two estates to which plants of twenty-three different Trinidad seedlings had been distributed since 1923; three of these showed good growth and general appearance on both estates, three others on one, and two on the other estate, were also very promising in appearance. The average sucrose in juice per acre of these eight canes for three to six crops varies from 3·80 tons to 4·32.

Mosaic Disease.

There was a slight increase in the percentage of infection rising from 0·0118 per cent. in 1927 to 0·0163 this year. The increase occurred in three fields, two containing New Trinidad Seedlings and one containing recent importations of new varieties from Porto Rico. Thirty stools were destroyed on 85 acres containing 184,771 stools.

Other Crops.

The usual care and attention was given to all other crops during the year.

Cover Crops.—The trial of various plants as cover crops and as green dressings has been continued. Eight of the twenty-eight reported as under trial have been eliminated, the remaining twenty together with five new ones, three species of *Phaseolus*, *Cassia Tora* and a cow pea, were given a more extended trial by broadcasting whenever sufficient seed was available, the results indicate that, in addition to the Sunn Hemp, Bengal beans and Pigeon peas mentioned in last year's report, two other varieties of Stizolobium, *i.e.*, Hangor and niveum, *Crotalaria Usaramoensis*, *Tephrosia candida* and *Calopogonium mucunoides* make very effective cover crops when broadcasted. The latter, a creeping plant, which makes a thick mat about a foot thick, possessing the additional advantage of growing under partial shade. Reaping of *Desmodium gyronis* seed, which was planted in March commenced in December, seed of a Desmodium, identified as *Desmodium purpureum* or *D. tortuosum*, found growing wild in the shade of rubber trees, were collected for sowing in the next season.

Hevea Rubber.—During the year the average increase in girth of the trees amounted to 0·55 inches. The average yield of dry rubber per tree for the seven months during which tapping continued amounted to 2·1 lb. and 1·37 lb. respectively for the two plots P and R. The higher average yield from P is due to the larger average girth of the trees.

Cacao.—All the plots showed an increased yield over the 1927 crop with the exception of the Gliricidia and Cacao plot which decreased by 36·39 per cent. causing the general crop to be 12·88 per cent. less than that of the previous year.

Camphor.—Fruiting was late and poor this year. Only five trees fruited and owing to late ripening only 48 seed were collected from one tree at the end of December. The wind break along the Southern Main Road was supplied, but mortality among the young trees although reduced, is still high resulting in a lack of uniformity in growth.

Citrus Grove.—The average yield from 72 orange trees was 74 and from 69 grape fruit 120 fruit per tree. Parson Brown with 158 fruit per tree gave the highest yield for oranges, more than double that of the next and five times more than each of the other two. Marsh with 206 fruit per tree heads the list for grape fruit.

Bananas.—The banana plots went out of cultivation this year and small plots to provide plants if required were replanted.

Cotton.—Sea Island cotton crop again failed; owing to leaf rust, boll development was slow. In consequence the crop has been delayed and no reaping could be done before the end of the year. A new plot of Cauto cotton was planted in November.

Pigeon Peas.—The planting of progeny rows, from trees selected for the ripening of all their seed together, was continued, with seed selected from two trees from the last crop, which fulfilled this requirement. Reaping has not yet been completed, but indications are that the percentage of trees ripening all their seed together is high.

Plots of Hawaiian and Arahar, the dwarf Indian pigeon pea, were also planted. The reaping of the former still continues, but the latter, which is also an early pea, yielded 415·8 lb. of seed per acre.

Pine Apples.—The percentage of bearing plants and of sound marketable fruit was 1·51 per cent. and 4·12 per cent. respectively higher than last year. Black Antigua shows the highest percentage of bearing plants 40·59, Chocona of good sound fruit 55·55, and Red Spanish of diseased and damaged fruit 67·46.

The development of the citrus trees necessitated the removal of the greater part of the cultivation, 3,864 plants of the four varieties were accordingly planted elsewhere. An attempt to raise pine apple plants from seed was successful and 96 plants were raised; the seed took from 30 to 53 days to germinate.

Miscellaneous.—The usual crops of rice, yams, cassava and ground nuts were planted. Several plots of swamp rice failed owing to the cutting off of the water by the Imperial College of Tropical Agriculture. The slow growth of the yams during the year indicates a very poor crop, the growth of the cassava promises a good crop. Ground nuts were planted late. Jute germinated well but as usual commenced to flower when 18 inches high.

Diseases and Insect Pests.

With the exception of froghoppers which spread from the froghopper experiment plot in September-October and invaded the two adjacent fields, and the leaf rust of cotton which now appears every year in the Sea Island cotton plot, no serious disease or pest has been observed. The damage to pine apples by *Tmolus echion* was reduced by at least 50 per cent., and although a slight increase in Mosaic infection took place this year, the system of recording enables the danger spots to be immediately located and extra precautions taken to avoid any spread.

General.

Attention is again called to the urgent need of a store-room, trespassing after the Station is closed for the day, continues, the damage done by these trespassers cutting grass in the cultivation would be materially reduced if the Manager resided at the Station. Seven convictions were secured, one of which was for malicious damage, and poundage was levied on one animal. The Office and Field Assistant was absent acting as Clerk at the Government Farm for

two months. The work of the general staff was satisfactory. Cane seed were supplied by the authorities of the following estates to whom the thanks of the department are due: Ste. Madeleine Company, Forres Park, Exchange, Esperanza, Caroni and the Trinidad Sugar Estates, Limited.

Visits were paid by the Post-graduate and Diploma students of the Imperial College of Tropical Agriculture accompanied by the Principal and Professor of Agriculture. The Tacarigua District Agricultural Society also visited the Station.

Owing to accounts amounting to £17 not having been paid by the end of the year the actual revenue collected fell short of the revised estimate by £2. 11s. 3½d.

Expenditure.

	£	s.	d.
A.—Personal Emoluments	372	0	0
B.—Wages of Extra Employees—			
Field Assistant and Office and Field Assistant	240	0	0
Cultivation " Cane and Other Crops "	1,539	19	8½
Maintenance	399	19	6
C.—Travelling	7	16	5½
F.—Materials	174	16	2
G.—Stock	299	19	3½
	£3,034	11	1½

Revenue.

	£	s.	d.
Cane and Cane plants	1,151	12	5½
Bananas	28	3	5½
Yams	7	16	4
Peas and Beans	7	19	0
Pine apples and Pineapple plants	51	14	10
Rice Paddy	10	3	6
Citrus Fruit	27	6	10
Cotton	51	5	5
Cacao	17	10	11
Molasses	34	10	7½
Miscellaneous	26	5	4
	£1,414	8	8½

Table 2.—Froghopper Experiment Field 19 Yield per Acre—Variety B. 156.

Age of Cane.	Area 22,704 Square Feet.			Area 22,972 Square Feet.		
	Sodium Nitrate.	Control.	Difference + or −	Ammonium Sulphate.	Control.	Difference + or −
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1925 Plants ..	40.24	41.56	− 1.32	41.54	39.24	+ 2.30
1926 1st Ratoons ..	27.81	27.26	+ .55	33.75	28.52	+ 5.23
1927 2nd Ratoons ..	22.27	26.18	− 3.91	28.52	25.61	+ 2.91
1928 3rd Ratoons ..	10.72	11.17	− .45	8.62	9.34	− .72
Average 4 Crops ..	25.26	26.54	− 1.28	28.10	25.68	+ 2.42

Table 3.—Banking *vs.* Flat Cultivation.

AVERAGE OF 4 PLOTS OF 2,640 SQUARE FEET.

Variety.	Banked.	Flat.	Difference + or −
	Tons.	Tons.	Tons.
B.H. 10 (12)	23.30	31.91	− 8.61
Ba. 11569	17.16	13.91	+ 3.25
Q. Badilla U.	18.71	18.45	+ 0.26

Table 4.—Distance Planting Field 14.

AREA OF PLOTS—5,500 SQUARE FEET.

Variety.	Plot 1 4 ft. by 2 ft.	Plot 2 4 ft. by 3 ft.	Plot 3 4 ft. by 4 ft.	Plot 4 4 ft. by 5 ft.
	Tons.	Tons.	Tons.	Tons.
T. 608	32.76	35.83	40.49	31.48
B.H. 10 (12)	61.28	56.13	58.01	51.38

Table 5.—Whale Meal Manurial Experiment Field 19, Yield per Acre.

AREA, AVERAGE OF 4 PLOTS OF 2,640 SQUARE FEET.

Variety.	Plot.	1st Ratoons 1926.	2nd Ratoons 1927.	3rd Ratoons 1928.	Average 3 Crops	Difference + or −
		Tons.	Tons.	Tons.	Tons.	Tons.
B.H. 10 (12)	Manured ..	43.32	44.44	27.94	38.23	+ 0.99
	Control	42.38	42.07	27.27	37.24	
Ba. 6032	Manured ..	34.64	30.72	* 6.59	23.98	+ 0.59
	Control	33.32	30.00	* 6.85	23.39	
Ba. 11569	Manured ..	40.06	40.16	15.72	31.98	+ 1.21
	Control	38.35	38.61	15.36	30.77	
Q. Badilla U ..	Manured ..	34.28	32.48	19.12	28.63	+ 1.50
	Control	32.27	31.08	18.04	27.13	

* Attacked by Froghoppers.

Field 20.

AREA OF PLANT CANES = 3,740 SQUARE FEET. RATOONS AVERAGE OF 2 PLOTS OF 3,740 SQUARE FEET.

Variety.	Plot.	Plants 1926.	1st Ratoons 1927.	2nd Ratoons 1928.	Average 3 Crops.	Difference + or −
		Tons.	Tons.	Tons.	Tons.	Tons.
Ba. 11569	Manured ..	50.77	43.60	14.33	36.23	+ 3.07
	Control	46.67	39.12	13.68	33.16	

Table 6.—H.O.P. Compound Fish Manure Field 20.

AREA MANURED PLOTS 2,200, CONTROL PLOTS 4,400 SQUARE FEET.

Variety.	Plot.	1st Ratoons 1927.	2nd Ratoons 1928.	Average 2 Crops.	Difference + or —
		Tons.	Tons.	Tons.	Tons.
C. 301	Manured	20.04	15.09	17.56	— 1.66
	Control	26.92	12.12	19.52	
C. 650	Manured	35.67	11.88	23.77	+ 3.36
	Control	31.05	9.77	20.41	

Table 7.—Yield per Acre Adco Manurial Experiment.

AREA —ADCO PLOTS 3,300 SQUARE FEET, PEN MANURE PLOTS 2,200 SQUARE FEET.

Variety.	Adco.	Pen Manure.	Difference + or —	Variety.	Adco.	Pen Manure.	Difference + or —
	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.
T. 455	27.88	25.74	+ 2.14	B. 6835 ..	35.80	42.57	— 6.77
T. 487	18.15	17.57	+ 0.58	C.O. 210 ..	35.80	41.82	— 6.02
T. 547	29.37	24.25	+ 5.12	T. 595	31.68	39.10	— 7.42
C.O. 214 ..	30.52	25.74	+ 4.78	T. 637	34.48	42.32	— 7.84
T. 1022	45.21	40.59	+ 4.62	T. 650	32.83	42.81	— 9.98
T. 1188	26.73	22.77	+ 3.96	T. 651	31.35	36.13	— 4.78
T. 1198	37.12	30.93	+ 6.19	L. 511	26.89	27.96	— 1.07
C.O. 213 ..	60.88	49.00	+ 11.88	Cuban	35.97	37.12	— 1.15
Java Unknown ..	55.11	47.02	+ 8.09	T. 1113	34.98	52.47	— 17.49
T. 1811	67.32	42.32	+ 25.00	T. 1189	33.82	36.13	— 2.31
T. 2009	33.00	28.71	+ 4.29	M.P. 55	30.52	62.86	— 32.34
T. 2110	36.13	40.09	— 3.96	T. 1893	49.35	51.23	— 1.90

Table 8.—Yield per Acre Ammophos Manurial Experiment Plants.—Adco.

Variety.	Control 880 Sq. Ft.	Ammophos 1,540 Sq. Ft.	Difference + or —	Ammophos and Sulphate of Potash 880 Sq. Ft.	Difference + or —
	Tons.	Tons.	Tons.	Tons.	Tons.
S.C. 12/4	44.55	47.72	+ 3.17	48.88	+ 4.33
Ba. 11569	41.45	40.65	— .80	38.36	— 3.09

Pen Manure.

Variety.	Control 1,100 Sq. Ft.	Ammophos 220 Sq. Ft.	Difference + or —	Ammophos and Sulphate of Potash 880 Sq. Ft.	Difference + or —
	Tons.	Tons.	Tons.	Tons.	Tons.
S.C. 12/4	49.00	42.07	— 6.93	37.74	— 11.26
Ba. 11569	46.03	34.65	— 11.38	44.55	— 1.48

1st Ratoons—Area of Plots 1,100 Square feet.

Variety.	Ammophos.		Control.	Difference + or —
	Amount applied per acre.	Yield Canes per acre.		
	lb.	Tons.	Tons.	Tons.
T. 619	250	24.25	16.33	+ 7.92
T. 637	375	17.32	17.82	— 0.50
T. 914	500	19.30	12.37	+ 6.93

Table 9.—Seedling Canes raised in 1928.

Variety.	Number of Boxes.		Number of Plants Pricked off.	Variety.	Number of Boxes.		Number of Plants Pricked off.
	Sown.	Germinated.			Sown.	Germinated.	
Bourbon ..	6	2	60	H. 27 ..	3	..	..
B. 347 ..	2	..	..	C.O. 210 ..	3	..	..
Cuban ..	2	..	..	P.O.J. 2725 ..	5	..	..
H. ?. ..	5	..	..	Tuc. 510 ..	4	..	..
B.H. 10 (12) ..	16	10	300	T. 595 ..	2	..	..
Ba. 11569 ..	9	8	480	T. 608 ..	2	..	..
B. 156 ..	1	..	..	T. 718 ..	4	..	..
B.S.F. ..	2	..	..	T. 735 ..	4	1	..
S.C. 12/4 ..	13	4	..	T. 1353 ..	2	1	60
D. 109 ..	6	4	..	T. 1903 ..	4	2	..
D. 2468 ..	..	..	..				
	..	..	..		95	32	900

Table 10.—Mosaic Disease 1928.

Field No.	Acreage.	No. of Stools.	No. of Stools attacked.	Per cent. attacked.	Field No.	Acreage.	No. of Stools.	No. of Stools attacked.	Per cent. attacked.
1 ..	3.21	6991.38	..	..	B. Fd.	29.56	63189.72	19	..
2 ..	2.5	5445.00	8	.147	13 ..	9.7	21126.60	2	.009
3 ..	1.88	3722.40	2	.053	14 ..	10.00	21780.00	1	.004
4 ..	1.4	3049.2	1	.032	15 ..	8.25	17968.50	1	.005
5 ..	1.00	2178.00	1	.046	16 ..	6.72	14636.16	7	.048
8 ..	2.04	4094.64	7	.171	17 ..	5.58	12153.24	..	..
9 ..	2.96	6446.88	..	..	18 ..	2.45	5336.10	..	..
10 ..	3.34	7274.52	..	..	19 ..	8.80	19166.40	..	..
11 ..	2.38	4712.40	..	..	20 ..	4.05	8820.90	..	..
12 ..	8.85	19275.30	..	..					
C. Fd.	29.56	63189.72	19		Total ..	85.11	184177.62	30	.0163

Table 11.—Return of Hevea Rubber for the year 1928.

AVERAGE GIRTH OF 70 TREES 38.5 INCHES.

AVERAGE INCREASE IN GIRTH OF 70 TREES DURING THE YEAR .55 INCHES.

Section and Period of Tapping.	No. of Trees.	Rubber.		Average per Tree.			Dry Rubber.	
		Latex C.C.	Scrap Grams.	Latex C.C.	Scrap Grams.	Girth Inches.	Plot Lb.	Per Tree Lb.
P Every 2nd day ..	20	41,070	1994.130	2053.5	99.706	45.8	42	2.1
R Every 2nd day	43	65,870	2718.780	1531.86	63.227	33.49	59	1.37

Table 12.—Comparison of Cacao Crop 1927 and 1928.

Plot.	No. of Pods Reaped.		Difference.		Average No. of Pods per bearing tree.	
	1927.	1928.	No. of Pods.	Per cent.	No. of Trees.	No. of Pods.
Gliricidia and Cacao	7,729	4,916	—2,813	36.39	250	19.66
Shaded Cacao	3,081	3,426	+ 345	11.19	217	15.79
Grafted Cacao	1,775	1,967	+ 192	10.82	109	18.05
Budded Cacao	375	982	+ 607	161.87	79	12.43
Total	12,960	11,291	—1,669	12.88	655	17.24

Table 13.—Return of Citrus Fruit Reaped for the year 1928.

Variety.	No. of Trees.	No. of Fruit.	Average No. per Tree.	Variety.	No. of Trees.	No. of Fruit.	Average No. per Tree.
Washington Navel ..	18	542	30.11	Walters	18	1,843	102.39
Jaffa	18	551	30.61	Marsh	18	3,724	206.89
Parson Brown ..	18	2,849	158.28	Fosters	15	1,929	128.60
Tardiff Hart's Late ..	18	1,390	77.22	Duncan	18	788	43.78
Total	72	5,332	74.06	Total	69	8,284	120.06

Table 14.—Yield of Pineapples 1928.

Variety.	Plants	Yield—No. of Fruit.				Percentage.			Plants bearing fruit.
		Good.	Damaged.	Gummed.	Total.	Good.	Damaged.	Gummed.	
Black Antigua ..	5,382	1,028	531	626	2,185	47.04	24.30	28.66	40.59
Sugar Loaf ..	2,653	245	168	121	534	45.88	31.46	22.66	20.13
Red Spanish ..	1,172	27	18	38	83	32.53	21.69	45.78	7.08
Chocona ..	429	40	23	9	72	55.56	31.94	12.50	16.78
Total ..	9,636	1,340	740	794	2,874	46.62	25.75	27.63	29.82

CHEMICAL DIVISION.

Mr. J. de Verteuil, the Agricultural Chemist reports as follows :—

Sugar.

TRINIDAD SEEDLING CANES.—The raising of the canes has been continued at the St. Augustine Experiment Station. The testing work was done in a small improvised laboratory at the adjoining Government Farm where the canes are crushed in a small Chattanooga mill. 1,933 samples were so crushed and tested in 1928. Seedlings raised in 1917, 1918 and 1919 are no longer grown in small plots by themselves, but the best of these are being grown on larger plots, known as the "variety" plots. The following are the varieties so planted out :—T.455, T. 487, T. 595, T. 608, T. 619, T. 637, T. 650, T. 831, T. 917 and T. 1022. They have given for the average of at least fifteen crops (6 of plant canes, 5 of first and 4 of second ratoons), results which compare favourably with B.H.10(12), and better than those obtained from B. 156 and Ba. 6032, grown under identical conditions.

Results from the seedlings raised in 1920 have been obtained for five crops of plant canes and four and three crops as first and second ratoons. The best of this series are T. 1198, T. 1188 and T. 1320. They have given an average yield of 4·03, 3·92 and 3·82 tons of sucrose per acre per annum for twelve crops (5 of plant canes, 4 of first and 3 of second ratoons) as against 4·24 tons for B.H. 10 (12). T. 1236, T. 1203, T. 1353, T. 1429, T. 1546, T. 1624 and T. 1393 have also given good results, viz. :—from 3·54 to 3·66 tons of sucrose per acre per annum as against 3·21 and 3·10 tons for Ba. 6032 and B. 156 respectively.

Results of the 1921 seedlings have been obtained during the past four years as plant canes and from three and two crops as first and second ratoons. There are several promising canes among this lot, the best being T. 2020 with an average of 4·09 tons of sucrose per acre for nine crops as against 4·00 tons for B.H.10(12). T. 2294 has also given better results than B.H.10(12), viz. :—4·06 tons of sucrose per acre, but this result has been obtained from four crops only (2 of plant canes and 1 each of first and second ratoons). It is followed by T. 2110, T. 1903, T. 2019, T. 2275, T. 1951 and T. 1995 with an average of 3·92, 3·90, 3·87, 3·82, 3·81 and 3·74 tons of sucrose per acre for four crops of plant canes, three of first and two of second ratoons. Six other varieties, viz :—T. 1893, T. 1811, T. 2284, T. 1891, T. 2009 and T. 2293 have given for the nine crops from 3·62 to 3·68 tons of sucrose per acre per annum as against 3·54 and 2·40 tons from B. 156 and Ba. 6032 for the same period.

Comparatively few seedlings were raised in 1922. Results have been obtained during the past three years as plant canes, during 1927 and 1928 as first ratoons and during 1928 as second ratoons. B.H.10(12) which was grown among these plots for comparison, has given an extraordinary high yield, viz. :—an average of 6·32 tons of sucrose per acre and this is much better than that obtained from any of the seedlings. T. 2392 and T. 2399 are, however, very promising canes and they gave 4·81 and 4·72 tons of sucrose per acre per annum for the six crops as against 4·05 and 3·65 tons per acre for B. 156 and Ba. 6032 respectively. The results obtained from T. 2395, T. 2400, T. 2354 and T. 2414, viz. :—from 3·79, to 4·04 tons of sucrose per acre per annum are better than those of Ba. 6032.

A large number of seedlings were raised in 1923. Plots of plant canes were grown for 1927 and 1928 crops and plots of first ratoons were reaped in 1928. In this series B.H.10(12) has also topped all of the seedlings with an average yield of 8·04 tons of sucrose per acre for the three crops. Four of the seedlings, viz.:—T. 2755, T. 2640, T. 2620 and T. 2673 with 7·61, 6·97, 6·12 and 6·00 tons of sucrose per acre respectively have done much better than B.156 ; eleven others have given from 5·18 to 5·88 tons of sucrose as against 5·00 tons per acre for B. 156. Fourteen other varieties have given from 4·55 to 4·99 tons of sucrose per acre per annum for the three crops as against 4·47 tons per acre for Ba. 6032.

A large number of seedlings were also raised in 1924, they were grown in plots for the first time and the juice tested in April 1928. T.3002 has given the best results, viz. :—128·70 tons of cane with an indicated yield of sucrose of 14·84 tons per acre. It is followed by T. 3107, T. 3257, T. 2912 and T. 2981 with yields of 79·20, 81·67, 81·67 and 71·77 tons of cane containing 9·86, 9·59, 9·45 and 9·06 tons of sucrose per acre respectively as against 74·25 tons of cane containing 8·04 tons of sucrose per acre for B.H.10(12). Seven more of the Trinidad seedlings, viz.:—T. 2867, T. 3029, T. 2943, T. 3264, T. 2903, T. 3214 and T. 3094 with a yield of from 69·30 to 86·62 tons of cane containing from 8·08 to 8·87 tons of indicated sucrose per acre have also done better than B.H.10(12). Seventy-four other seedlings have given better results than B. 156 which gave 58·16 tons of cane containing 5·49 tons of sucrose per acre. Ba. 6032, the other standard variety, gave 47·02 tons of cane with an indicated yield of sucrose of 4·67 tons per acre and this result was exceeded by thirty-five more of the Trinidad seedlings.

At least 90 per cent. of the area grown in sugar-cane at the Experiment Station consists of Trinidad seedlings, the balance being the three standard varieties B.H.10(12), B. 156 and Ba. 6032 which are grown amongst the seedlings, on plots of the same size for comparison, and new importations. 1362·8 tons of cane were reaped for the 1928 crop from 61 acres, an average of 22·34 tons per acre, and sold to the Tacarigua Factory. The mixed juice from the crusher and first mill was tested for each truck load of canes and gave an average of 1·658 lb. of sucrose per gallon.

Manurial Experiments on Cacao.

Experiments on behalf of Nitram Limited.—The Manurial Experiments started in December, 1925, on cacao and coconuts on behalf of the British Sulphate of Ammonia Federation Limited, now Nitram Limited, have been continued and the results of the third crop, for the experiments on cacao recorded. Nitram Limited, associated with Imperial Chemical Industries Limited, is now the sole selling and propaganda agents for the British Sulphate of Ammonia Federation Limited. The entire propaganda and Agricultural Advisory staff of the British Sulphate of Ammonia Federation has been handed over to Nitram Limited, so that there is no lack of continuation in the work.

A synopsis of the Experiments which are being made was given in the annual report for 1927. Owing to the two abnormal seasons for the crops of 1926 and 1927, no trustworthy information has been obtained from the small plot experiments in Field 5. The results from the large plot experiments in Field 20, at River Estate, and from La Vega Estate, Brasso, are nil. A second application of the manures was made in May, 1928, but the results from this application will not be available until the 1929 crop has been reaped. The manures were supplied by Nitram Limited.

A progress report giving the results of the three crops to 31st December, 1928, has been prepared.

Experiments for the American Cyanamid Company.—Manurial Experiments on cacao were also started in June, 1927, in a part of Field 5 at River Estate, with pen manure applied in three different ways and with Ammo-phos fertilizer supplied by the American Cyanamid Company.

The cacao trees are 30 to 40 years of age, planted about 14 feet apart and shaded with Immortel trees, about 40 to the acre. There are six manured plots and two controls. Plots A., B., C., E., F. and H. are approximately one-third of an acre, D. and G. one-quarter of an acre each.

The manures were applied during the last week of June, 1927, and are to be repeated every three years at the following rates per acre :—

A. 15 tons pen manure applied in semi-circular trenches, four to five feet from the trunk of the trees.
B. Control or No Manure plot.
C. 15 tons pen manure broadcasted and forked in.
D. 15 tons pen manure applied as a mulch after forking.
E. 300 lb. Ammo-phos. 100 lb. Sulphate of potash.
F. 400 lb. Ammo-phos.
G. Control or No Manure plot.
H. 400 lb. Ammo-phos. 100 lb. Sulphate of potash.

The Ammo-phos used was grade 20/20, *i.e.*, containing 20 per cent. of ammonia and 20 per cent. of phosphoric acid.

The crop for one year, after applying the manures, has been recorded and a progress report giving the results obtained has been prepared. This preliminary report shows that in the pen-manured series plot C. (pen manure forked in) has given an increase of 169 lb. of commercial cacao per acre ; only a very slight increase of crop was obtained from pen manure applied in trenches and none from pen manure applied as a mulch. From the Ammo-phos an increase of 47; 138, and 161 lb. of commercial cacao per acre was obtained from F. (400 lb. ammo-phos), H. (400 lb. ammo-phos and 100 lb. sulphate of potash) and E. (300 lb. ammo-phos and 100 lb. sulphate of potash) respectively. Too much importance, however, must not be placed on the results of a single year.

Manurial Experiments on Coconuts.

The experiments on coconuts, on behalf of Nitram Limited are being made at Endeavour Estate, Chaguanas. The original experiments started in December, 1925, for the British Sulphate of Ammonia Federation will in future be called the Sulphate of Ammonia series, and those started in July, 1928, for Nitram Limited will be known as the Ammonia Chloride series.

Experiments with Sulphate of Ammonia.—These are being carried out on four whole fields, three of which have been manured and the fourth is kept as a control. The fields vary slightly in size, number and age of trees and the particulars for each field are as follows :—

Field.	Age of trees in 1926.	Area of field.	Per Acre.	
			No. of trees.	Manures applied.
1	13 to 14 years	8.8 acres	79	250 lb. Sulphate of Ammonia.
7	13 to 14 years	8.8 acres	85	250 lb. Sulphate of Ammonia. 100 lb. Sulphate of potash.
4	14 to 15 years	9.3 acres	82	250 lb. Sulphate of Ammonia. 150 lb. Ground phosphates. 100 lb. Sulphate of potash.
2	14 to 15 years	17.4 acres	83	Control—No Manure.

Manures were applied in December, 1925 and 1927 respectively. The crop record of these fields for five years previous to manuring is known. The yields for the two years after manuring have been recorded and a progress report to 30th June, 1928, has been prepared. The results obtained for the average of the two crops shows an increase from manuring for fields 1, 4, and 7 of 593, 718, and 965 nuts per acre per annum respectively. This increase is more than sufficient to pay for the cost of the first application of the manures and the profit shown for each field per acre is as follows :—*Field* 1. (Sulphate of ammonia) $7.59, *Field* 4 (complete fertilizer) $7.80, and *Field* 7 (Sulphates of ammonia and potash) $13.28

Experiments with Ammonium chloride.—These Experiments were planned with the object of testing the relative values of ammonium chloride and sulphate of ammonia as a source of nitrogen for fertilizing coconut trees. They are being carried out on six whole fields, five of which have been manured and the sixth is kept as a control. The fields vary slightly in size, number, and age of trees, and the particulars for each field are as follows :—

Field.	Age of trees in July, 1928.	Area of Field.	Per Acre.	
			No. of Trees.	Manures applied.
6 S.	16½ years	10.5 acres	79	206¼ lb. Ammonium chloride. 150 lb. Ground phosphates. 100 lb. Sulphate of potash.
6 N.	15½ years	7.5 acres	87	Control—No Manure.
10 W.	15½ years	8.4 acres	81	250 lb. Sulphate of ammonia. 150 lb. Ground phosphates. 100 lb. Sulphate of potash.
10 E.	15½ years	6.3 acres	76	206¼ lb. Ammonium chloride. 100 lb. Sulphate of potash.
14 W.	15 years	7.9 acres	75	250 lb. Sulphate of ammonia. 100 lb. Sulphate of potash.
14 E.	15 years	3.6 acres	82	206¼ lb. Ammonium chloride.

The manures were applied during the first week of July, 1928, and they cannot have any effect before the crop year commencing in July, 1929. The crop which is now being reaped will be considered as a natural yield of the field and will make the fourth crop recorded previous to manuring.

Manurial Experiments on Citrus Trees.

Small experiment plots were started in June, 1927, on citrus trees at the St. Augustine Experiment Station with Ammo-phos supplied by the American Cyanamid Company. There are four plots of oranges and four of grape fruit ; each plot, made up of two beds, is planted with a different variety. There are eighteen trees in each plot, nine manured and nine un-manured trees. The trees were planted in July, 1923, 25 feet apart, and most of the trees have borne one crop previous to manuring.

The following manures were applied per acre to two plots each of the oranges and grape fruit, respectively, in June and December, 1928 :—

1. 490 lb. Ammo-phos.
2. 490 lb. Ammo-phos. 105 lb. Sulphate of potash.

The number of fruit reaped from the first crop after manuring has been recorded and graded according to size. A report on the results obtained is being prepared.

GOVERNMENT FARM, TRINIDAD.

Captain H. V. M. Metivier, Officer-in-Charge, reports as follows :—

Staff.

Mr. M. D. Lumsden, the Overseer, was appointed from 1st April, Manager of the Government Farm and Curator of the Botanic Station, Tobago, in the place of Captain R. J. Link who, owing to ill-health, resigned at the end of 1927. This appointment was increased to the Grade £450-£500 and the newly appointed Officer, who is a qualified Veterinary Surgeon is allowed private practice. This officer is also required to carry out the following Government Veterinary duties (*a*) Meat Inspector for Scarborough (*b*) Examiner of Animals arriving in Tobago (*c*) Veterinary care of all Government animals.

The post of Overseer at the Farm was abolished and an Assistant Officer-in-Charge appointed instead with an increase of £100. Mr. J. L. Shannon, D.V.M. took up this post on 1st April. Mr. J. Bell Smythe, Clerk at the Government Farm, was suspended from duty during the month of October owing to certain irregularities and was later dismissed the service. Mr. A. E. Joseph, Field and Office Assistant of the St. Augustine Experiment Station, acted for him temporarily and Mr. J. H. Brooks, Traffic Inspector of the Trinidad Government Railway, was appointed to the post in December, but it was impossible for him to assume his new duties until 1st January, 1929.

Weather.

The rainfall was only 59 inches, about the normal, as compared with 85 in 1927. During the first six months there was a fall of 18 inches and the driest month was May ·78 inches, so that the pastures did not become parched up as usual during the dry season.

The St. Joseph River was again in flood frequently during the year and the work on the Farm had to be carried out at a great disadvantage during these periods as there were no provisions made in Public Works estimates to build a bridge for the Farm across this River. It is hoped that this long wanted structure will be erected next year.

Cattle.

During the year two more batches of pure bred cattle were imported from the Canadian Agricultural Department—the first lot arrived at the end of March and the second consignment early in October. The Farm received one Holstein bull calf and three heifer calves of the same breed in the March shipment; in the second shipment there were two more pure bred Holstein bull calves for the Farm. The average landed cost of the animals was $120. All were between nine and eleven months of age and only one developed a serious attack of Red Water Fever. In this case Trypan Blue was injected intravenously and recovery soon followed. The other pure bred Holstein stock imported in 1927 have done quite well. One of the heifers calved in December (bull calf) but the other unfortunately aborted a five months old foetus. The young bulls imported in 1927 were all in full service during the year.

The following pure bred Holstein bulls stood for service in various out districts:—

"Royal Duke"—Port-of-Spain (August-November), and Usine Ste. Madeleine (December).

"King Artis Rooker"—Exchange Estate, Couva (May-September).

"Count Abbekerk Wayne"—Port-of-Spain (December).

"Jewel Echo Model"—Caroni Estate (December).

The three bulls "King Butter Girl Walker," "Segis Echo Rooker", and "Cobequid Prince Ormsby" stood for service at the Farm throughout the year.

One hundred and fifty-three cows and heifers were bred to pure bred bulls at the Farm during the year including 76 belonging to the Farm. This number does not include the cows in the Public Pasture where a pure bred Holstein bull was turned out, without any additional charge, every evening from 1st April. The service fee of these pure bred bulls was reduced from $3.60 to $2 from 1st July including the bull at service in Port-of-Spain. In the case of Sugar Estates a charge of $10 per month was made, the Estates feeding the animals and being responsible for their loss.

The pure bred bull "Mindi Homestead de Kol" died at the Farm in January from peritonitis caused by a wire nail, which, no doubt, he had swallowed, perforating his reticulum.

Dairy Herd.—This herd produced 50,155 gallons of milk an increase of 2,000 gallons on the previous year. 28,488 gallons were supplied to the Public Institutions. The Tacarigua Hospital was added to the list of Government Institutions from August. The dairy cows were again fed on a basis of 3½ lb.

of feed for every gallon of milk and the concentrates chiefly used were cotton seed meal, linseed meal, middlings, coconut meal, and bran. A mineral mixture made up of 2½ lb. of sterilized bone meal flour and 2½ lb. of salt was fed to every 100 lb. of feed. The calf meal used was made up of rolled oats, linseed meal, corn meal, and flour (equal parts) and 1 lb. of this mixture gave one gallon of gruel. The calves did very well on this gruel and, as in previous years, digestive troubles were corrected by the regular use of lime water. During the year ½ ton of a well known calf meal was imported from England to compare the results with the meal prepared on the Farm and the results were decidedly in favour of our home-made gruel. At the Annual Sale five young grade Holstein bulls averaged $30 each and eighteen grade Holstein heifers $52 each. Ten cows averaged $58. In the course of the year four cows, no longer fit for the dairy, were sold to the butcher and eight cows either fresh in milk or heavy in calf were purchased locally.

Zebu Herd.—As in former years this herd was maintained independently of the dairy herd. The cows in milk are stall fed and all the others brought in once daily for their concentrates and for inspection. Owing to the dispersal sale of the breeding stock at Forres Park Estate an opportunity occurred at the end of the year to introduce fresh blood into the herd and the following animals were purchased, a pure bred cow with bull calf, two other pure bred cows in calf, two pure bred heifers in calf, two highly graded cows in calf and one grade heifer. This has overcome the handicap of importing new stock from India due to the risk of Foot and Mouth Disease.

The following animals were sold from this herd during the year:—

St. Kitts Nevis Presidency	1 three year old bull	$ 360.00
	1 yearling bull	240.00
Cuba (Walterio Bertot)	1 two year old bull	360.00
	3 yearling bulls	720.00
	1 cow	240.00
	1 yearling heifer	100.00
Venezuela (General Casado)	1 yearling bull	400.00
Cuba (Lykes Bros)	3 grade Zebu bulls	
	2 grade Zebu heifers	600.00
Frank Agostini, Trinidad	1 pure bred yearling bull	240.00
	2 grade heifers	100.00
Andre Agostini	1 grade yearling bull	50.00
Reform Estate, Trinidad	1 grade yearling bull	75.00
		$3,485.00

A pure bred Zebu bull five years old valued at $480 was sent to the Tobago Government Farm early in the year.

Bulls at Public Pastures.—Besides the pure bred Holstein bulls standing for service in out districts, five grade bulls were stationed at the Mucurapo Stables for the use of the Pastures in Port-of-Spain and for service at the station, two grade Holstein bulls at Paradise Pasture, San Fernando, one grade Guernsey at Arima, and his full brother at River Estate. The revenue from the services of these grade bulls amounted to $400. The pure bred Red Poll bull at Paradise Pasture died in February and was replaced by a grade Holstein bull.

Health.—With regard to contagious abortions the same precautionary measures were carried out as in former years. 85 cows calved normally and ten aborted.

From other diseases and injuries the losses amounted to ten cows and two calves. The death rate in young stock has decreased remarkably and can be attributed to the proper system of handling and the regular monthly dosing with copper sulphate against internal parasites.

One cow died from arsenical poisoning, two from Septicaemia following Parturition, one had a fractured limb, one died from Piroplasmosis (Red Water), five reacted to the Tuberculin test and were destroyed.

Horsekind.

The Thoroughbred stallion "Waterbass" was returned to British Guiana on 10th February. "Nelsweep" arrived from British Guiana on 18th February, and remained at the Farm until 8th November, when he was lent to Caroni Estate in exchange for "Silver Gem" for the 1929 season. "Golden Eaglet" was sent to San Fernando on 18th April and returned on 17th May, he was then sent to Tobago (21st May) where he remained until the end of the year when he was replaced by "Silver Gem."

"Daddy," a four year old by "Harry of Hereford" out of a Prince Palatine mare, arrived in Trinidad from France *via* England on 10th November having been presented to the Colony by Lord Derby through the instrumentality of the Honourable Captain A. A. Cipriani. "Daddy" arrived in good health, which he has maintained, and by the end of the year improved considerably in condition. He is being exercised regularly and kept fit for beginning his first season in February, 1929.

Two half bred colts sold at the annual sale realised $135. "Nellie's" colt by "Quickmatch" was a full brother to the winners "Red Fox" and "Quicklight." An eight months old mule colt by "Emperor" out of "Dolly" was sold also for $68.

The two faithful old brood mares "Nellie" and "Cavel," each the dam of two winners, again produced colts by "Nelsweep." The success of these two old half bred brood mares should be an encouragement to purchase several thoroughbred mares for the Farm, as opportunities occur, especially now that two such high class stallions as "Golden Eaglet" and "Daddy" have come to the assistance of the proved sires "Quickmatch" and "Nelsweep." "Quickmatch" was kept at stud in Tobago throughout the year. It is intended to return "Quickmatch" to Trinidad early in 1929 when every attention will be given him in an endeavour to restore his condition and prolong his valuable services for several years longer.

The Kentucky jack donkey "Emperor" was bred to 41 mares during the year. His service fee as usual was $7.50. His health and condition, as also his fertility, have been maintained at the same high standard of past years.

The smaller jack donkey "Barbados Joe" was bred to 17 jennies and five mares during the year (service fee $1 for jennies and $5 for mares). He was again troubled with fistulous withers necessitating repeated operations. This fact, combined with several cases of in-breeding to his own daughters, makes it imperative that a sound vigorous young jack of approved conformation should be acquired as soon as possible.

Pigs.

Twenty-eight young pure bred pigs were sold at the annual sale at an average of $10; the total realised for pigs during the year was $473.40. The number of outside services to the Farm boars was 20 at $1.50 each. Two Berkshire gilts in pig were imported from Canada and farrowed satisfactory litters. Three Large Black gilts in pig, and one boar, were purchased from the Large Black Society of England. It was stipulated when the order was placed with the Crown Agents that the pigs must go through the quarantine station at the Port of London which had been established for the specific purpose of safeguarding importers in the Colonies against the risk of introducing Foot and Mouth Disease from England. Unfortunately difficulties occurred and the order was not filled by the end of the year. An order has been placed in Canada for Large Black pigs with every hope of our receiving them early in 1929, without any danger of introducing Foot and Mouth Disease as this disease is not present in Canada.

Goats.

Six young goats were sold at the Annual Sale at an average of $8.50. The promise made in 1927 report, that an attempt would be made to purchase a buck of the well known "Baron Baldwin" strain, whose progeny are heavy milkers and always hornless, has been kept by the acquisition of the Saanen buck "Prince Perfection." This buck attracted considerable attention at the Farm during 1928, as he sires only hornless kids, the does of which, have developed into heavy, persistent, and in some cases continuous milkers. "Prince Perfection" who has inherited from his ancestors "Prince Baldwin" and "Baron Baldwin" well developed rudimentary teats which are capable of yielding a good flow of milk is a continuous source of interest to visitors, both local and foreign. The outside services this year were 38 or an increase of 14 over last year. The service fee was reduced from $2 to $1.50 from 1st July.

As in past years, the practice of lending out bucks for the improvement of dairy goats in the Colony, has been continued, and we have now available for this purpose, to approved parties, two pure bred Saanen bucks which were born locally from imported Swiss parents that cost £30 each. These mature bucks "Madel" and "Goldrobe" are proved sires of heavy milking daughters, and can be spared from the Farm early in 1929.

The nucleus of a herd of mutton goats has been started this year at the Farm, in order to satisfy a persistent demand from Tobago and certain districts in Trinidad where milk is not in demand, for a large breed of hardy easy keeping mutton goats. The goats selected for this purpose are the large lop-eared breed of Indian goats which are the pure descendants of goats landed in Barbados many years ago from the wreck of the "Lapwing" which was bound to British Guiana from India with emigrants. The sleek appearance and good condition of these goats at the Farm, reflect the correct feeding and proper care they have received in 1928, combined with the monthly administration of a dose of Copper Sulphate to each animal, as a precaution against internal parasites.

Poultry.

The amount realised for sale of poultry was $294.76 or $40 more than last year. The number of eggs sold was 2,650 and the revenue from eggs was $212.92 as compared with $175 in 1927.

The following new stock were imported from Canada: 30 Rhode Island Reds, 29 White Leghorns, and 25 Plymouth Rocks (Barred). Half the number was sent to the Tobago Farm.

Sale of Stock.

The Annual Sale was held on 2nd March. The attendance was excellent and the bidding very brisk. There was again a big demand for animals for other West Indian Islands including Cuba, and for Venezuela. The receipts were $3,667.60 a slight increase over last year. The amount realised for private sales was $3,521.18 making the total revenue from this source $7,188.78. $2,764.80 was spent on purchase of stock but our sales realised $4,424 more and the valuation of our Livestock was higher at the end of the year than last year.

Public Pastures and Stabling of Animals.

With the fairly even distribution of the rainfall during the early part of the year the Pastures on the Farm kept green through the dry season. As in former years two pastures were reserved for outside animals; the larger had an average of 75 head and the smaller, reserved for animals sent to be bred to the pure bred Holstein bulls, about 25 head. It was decided as there were now sufficient pure bred Holstein bulls at the Farm to turn one of these with no extra charge into the larger Public Pasture every evening, instead of a grade Bull.

The erection of concrete fencing was continued and 2,611 feet put up.

The daily average of horsekind pastured was 30, the majority were mares sent to be bred to the jack donkey.

The Revenue fron Pasture Fees was $1,552.90 and for stabling of mares, cows, goats, &c., $771.29, making a total of $2,324.19.

The cattle in the pastures were sprayed regularly and ticks were controlled in horsekind by the use of Tick Grease applied in the regions of the anus and inside the ears.

Fodder Plants.

The supply of fodder throughout the year was quite sufficient and it was possible to meet all the requirements of the Constabulary and all other orders for grass, Uba cane or cane tops. The revenue from the sale of fodder was $2,578.95, $62.40 less than in 1927.

Uba Canes.—It was only necessary to cut ten acres of this cane for fodder ; of the other eight acres two were burnt and then cut for factory purposes and the other six allowed to stand over. It was intended to supply more of the cane for the factory but there was such a difficulty to get the cutters, cartermen and loaders to handle this burnt cane that it was decided to burn only two acres. All the canes were ratoons and the yields were most satisfactory ; in the case of the two acres cut for the factory an average of twenty tons to the acre was obtained. The difficulty of making use of surplus Uba canes cropped up again as last year, and in order to overcome this difficulty it has been decided to throw out part of this cultivation (three acres this year and two next year) and to plant instead seedling canes. The three acres thrown out this year were planted with B.H. 10 (12) and the other two acres early next year will be planted in T.487. In replacing Uba canes by seedling canes it will be possible, should there be no need for the cane as fodder during the dry season, to sell the canes readily to the factory.

Sugar Canes.—During the crop season 914 tons of cane was supplied to Orange Grove Factory and 400 tons to the Imperial College of Tropical Agriculture. 38 tons of Uba canes were also supplied to Orange Grove. The total tonnage delivered to these two factories was 1,352 tons and the Revenue obtained from this source was $4,975.08 (£1,036 9s. 6d.). As in the case of 1927 the canes were sold on a sucrose basis but the juice was much better as it averaged about 1·5 lb. of sugar per gallon of juice as compared to 1·2 lb. last year.

The yields from the different plots were as follows :—

		tons.	*c.*	*q.*	*lb.*
5 acres	(third ratoons) chiefly B.H.10 (12)	147	0	3	21
13½ ,,	(do.) B.H. 10 (12) Ba.6032 B.156	377	15	0	6
11½ ,,	(2 ratoons) B.H. 10 (12) Ba.6032 B.156	401	3	1	24
5 ,,	(second ratoons) Ba. 11569	124	13	1	2
8½ ,,	Plant canes B.H.10 (12)	263	10	3	1
43½		1,314	3	1	26

This yield works out at 30 tons per acre with only one-fifth of the acreage in plant canes.

This acreage was kept under cultivation again this year but the old, fourth ratoons, were badly hit by the Froghopper blight especially the five-acre plot. Four and one-quarter acres planted in sweet potatoes at the end of 1927 was planted in seedling canes chiefly T. 487, T. 650 and B.H.10 (12). T. 487 is one of the richest Trinidad seedling canes produced at the St. Augustine Experiment Station and as the top is so excellent for fodder it has been decided to try this cane as well as T. 650 on some of the sugar cane plots. It will be interesting to see with our heavy manuring what our T.487 juice will average as compared with that from B.H.10 (12), B.156, Ba.6032, &c.

Sweet Potato Vines.—Fodder was obtained from the vines planted on 4¼ acres last year and three more acres were banked at the end of the year and cane, B.H.10 (12) planted in the furrows : the vines from this plot will be reaped early next year. The vines made a splendid substitute for part of the bulky feed for our heaviest milkers.

Elephant Grass.—This grass (*Pennisetum purpureum*) has now become well established on the grass fields and has given most satisfactory results. There was a good demand for plants as in former years.

Guatemala Grass.—(*Tripsacum laxum*). Two small plots have been planted with this grass and it is intended to increase the area next year. The stock like this fodder very much and it will make a change for them if a small area is kept in cultivation either alone or mixed with para grass.

" Java Unknown " Cane.—The area planted with this cane was not extended as it is believed that the better solution of the surplus Uba cane problem would be by growing good seedling canes T.487, B.H.10 (12), &c. In very dry years the whole plant would be cut down as fodder and with ordinary weather the canes could be sold to the factory and the tops used for fodder. A small plot of this cane was badly hit by Blight during the year and recovered very slowly.

Miscellaneous.

Coconut Plantation.—The trees adjoining the Recreation grounds especially on the Eastern side are now coming into good bearing. This area was again manured as well as that to the south and east of the office. A large number of nuts were fed to the pigs ; and $175.00 was obtained in Revenue for the sale of nuts.

Four of the Dwarf coconuts received from the Malay States in 1924 and planted to the south of the quarters of the Officer-in-Charge have now started to bear and the nuts have been planted in order to extend the cultivation.

Drying and Milling Plant.

There was practically no drying and milling done in the Factory during the year. The Factory was used during the crop season for testing seedling canes for the St. Augustine Experiment Station and for cutting up Uba cane and cane tops for fodder on the Farm. The crushing of our feed for the rest of the year was done in Port-of-Spain as it was cheaper.

Buildings.

The Public Works Department erected 24 model dairy stalls (Beatty's) in the cowshed and intends to put up a few every year until the whole cowshed is equipped with them. The buildings were also repaired. The expenditure by that Department was as follows :—

	£	s.	d
Water Rates	102	1	8
Repairs to Buildings generally	70	2	6
Dairy Stanchions	117	5	2
	£289	9	4

Educational Work, Meetings, &c.

During Health Week in Port-of-Spain the Farm erected model dairy stalls for cows and goats and installed a Model Dairy Room. In this room the handling of dairy utensils, washing, sterilizing, straining, bottle-filling, &c.) was carried out daily and clean milking demonstrated in the model stalls. The Farm Authorities were again thanked by the Town Clerk on behalf of the Health Week Committee for this display. At the Farmstead Bazaar held at the end of the year the Farm ran a miniature farm at which dairy cows, calves, goats and pigs were displayed : The handling of milk, the making of cream, and the feeding of calves were all demonstrated for educational purposes.

In conjunction with the Health Department demonstrations were given at the Farm every Tuesday afternoon for six months during the milking hours of the proper handling and breeding of dairy cows, the hand rearing of calves and the production of clean milk. Peasants engaged in dairying throughout the Colony attended these demonstrations, the Health Department providing omnibuses for their conveyance. The Surgeon-General, the Deputy Surgeon-General, the Medical Officer of Health for the City of Port-of-Spain, the Government Bacteriologist and several Sanitary Inspectors accompanied these small dairymen on different occasions.

The October meeting of the Agricultural Society was held at the Farm in the cowshed where a special stand was erected. The Officer-in-Charge gave an address with special reference to cattle breeding and milk production. The meeting was very well attended and at the close it was decided that a committee of the Society should go into the immediate requirements of the Farm with the view of approaching the government to include these in the Estimates for 1929.

The Farm was visited by the Post-Graduate students of the Imperial College of Tropical Agriculture as well as by the first and second year Diploma students who attended for practical demonstrations in their Veterinary and Animal Husbandry classes.

Revenue.	£	s.	d.
Sale of Stock	1,497	13	3
Sale of Canes	1,036	9	6
Sale of Milk and Eggs	3,595	3	5
Stud Fees	260	0	0
Pasturage and Stabling ..	484	4	1½
Grass and Coconuts	617	18	7
Miscellaneous	35	14	3
	£7,527	10	3½

Expenditure.	£	s.	d.
Personal Emoluments ..	512	10	8
Wages of Extra Employees ..	2,514	0	0
Wages, Trinidad Govt. Rly. ..	25	0	0
Travelling, Manager	3	1	9
Motor Lorry	226	13	3½
Miscellaneous	14	10	1
Materials	349	16	10½
Feed for Stock	1,439	17	6
Purchase of Stock	584	1	2½
Expenses of Stallions ..	149	18	11
Through Public Works Dept. as itemized on p. 12	289	9	4½
	£6,108	19	8

GOVERNMENT FARM, TOBAGO.

On 1st April Mr. M. D. Lumsden was appointed Manager in succession to Mr. R. J. Link resigned.

The receipts from the sale of coconuts and copra amounted to £205. 17s. 3½d. an increase of £109. 7s. 3½d. over 1927.

The public pasture has been brushed. The removal of the stumps entailed a considerable amount of work. The number of animals pastured increased from 23 to 45.

Eight acres of low-lying land under the coconuts were cleared, manured and mulched. A vigorous growth of grass resulted providing ample green fodder for the dry season. In addition small plots of Uba cane, Elephant grass and seedling canes have been planted.

Stud Animals.—The thorough-bred stallion "Golden Eaglet" arrived in May and returned to Trinidad in December. He served 28 mares.

The Kentucky donkey "President" served 28 mares.

The donkey "Foch" served 7 jennies.

The thorough-bred stallion "Quickmatch" who had been in Tobago since May, 1926, was returned to Trinidad on 20th December. Due to old age he has fallen off considerably.

Thirty-three hens and eight cocks of the following breeds were received: Plymouth Rock, Rhode Island Reds, and Leghorns. They are a vigorous lot of young birds.

Pigs.—The number of sows brought to the Large Black boar was 45. Another pure bred boar was obtained locally. He will be used principally on the Farm sows until the shipment of pigs which is on order arrives.

Receipts and Expenditure—1928.

Receipts.	Amount.	Expenditure.	Amount.
	£ s. d.		£ s. d.
Sale of Stock	19 7 6	Labour	309 7 7½
Do. Poultry	5 12 6		
Do. Eggs	5 8 5		
Do. Wood	4 7 6	Materials	24 19 10
Do. Coconuts	205 17 3½		
Medicines and Miscellaneous	4 12 7½		
Pasturage Fees	28 10 0	Clearing Pasture and Fencing	19 19 8½
Stabling of Mares	3 0 0		
Service Fees Quickmatch	2 1 8		
Do. Golden Eaglet	35 18 9	Feed—Stock	134 18 0
Do. President	39 1 3		
Do. Foch	1 15 0		
Do. Bulls	4 13 9	Travelling	11 5 0
Do. Boars	7 0 7½		
Do. Buck	10 0		
Do. Ram	18 0	Salaries	190 7 6
"Transfer Vouchers"—Wood £15, Grass £4 11 8	19 11 8		
	388 6 6½		690 17 8

Return of Live Stock Exported from Tobago 1925, 1926, 1927, 1928.

Stock.	1925.		1926.		1927.		1928.	
	No. shipped.	Value.	No. shipped.	Value.	No. shipped.	Value.	No. shipped.	Value.
Head.		£ s. d.		£ s. d.		£ s. d.		£ s. d.
Cattle	328	1,968 0 0	350	2,100 0 0	418	2,508 0 0	307	1,842 0 0
Sheep	1,230	1,230 0 0	1,067	800 5 0	2,105	2,105 0 0	868	868 0 0
Pigs	2,066	2,582 10 0	2,545	2,545 0 0	3,240	3,240 0 0	2,778	2,778 0 0
Horses	139	1,963 0 0	119	1,170 0 0	149	1,490 0 0	90	900 0 0
Mules	33	660 0 0	29	435 0 0	61	915 0 0	57	855 0 0
Donkeys	3	19 0 0	12	48 0 0	10	50 0 0	9	45 0 0
Goats	1,877	1,173 2 6	1,971	492 15 0	2,732	1,138 6 8	2,448	1,020 0 0
Dogs	73	36 10 0	90	37 10 0	129	64 10 0	82	41 0 0
Dozen.								
Poultry	2,565	2,565 0 0	4,033	5,041 5 0	5,253	5,253 0 0	4,965	4,965 0 0
Eggs	2,172	108 12 0	2,797	139 17 0	1,764	88 4 0	6,247	312 7 0
Turkeys	..	..	..	..	..	..	45	22 10 0
	..	12,305 14 6	..	12,809 12 0	..	16,852 0 8	..	13,648 17 0

Rainfall—Botanic Station, Tobago, 1927-1928.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
1927	3.95	7.28	2.87	6.74	5.50	15.17	5.66	4.39	5.33	8.12	9.22	7.32	81.55
1928	4.52	1.12	.55	3.28	2.08	6.73	9.13	6.19	9.54	4.95	16.44	4.73	69.26

Summary of Live Stock for year ending 31st December, 1928.

Particulars.	Stallions.	Donkeys.	Horses.	Mules.	Cattle.	Pigs.	Sheep.	Goats.	Poultry.
Stock on Hand 1st January, 1928	2	2	5	2	12	17	5	2	59
Increase (1) By Birth	..	..	..	..	1	5	3	..	7
(2) By Purchase	..	..	..	..	..	..	..	..	..
(3) By Transfer	1	..	..	..	1	3	..	1	41
Total	3	2	5	2	14	25	8	3	107
Decrease (1) By Sale	..	..	..	..	1	5	..	..	13
(2) By Transfer	3	..	..	..	..	2	..	1	..
(3) By Death	..	..	2	..	..	5	2	1	10
Total	3	..	2	..	1	12	2	2	23
Stock on hand 31st December, 1928	..	2	3	2	13	13	6	1	84

Valuation of Live Stock.

Description of Stock.			Value.	Total.
			$ c.	$ c.
Horses	..Gelding	..Stray-Shot	55 00	
Donkeys	..Stud Jack	..President	700 00	
Do.	.. do.	..Foch	70 00	825 00
Bulls	..Pure Bred Zebu	..Seepaulsingh	60 00	
Do.	.. do.	.. ..	240 00	
Do.	..Grade Freisian	..Holstein	75 00	
Oxen	..6 at $95	.. ..	570 00	
Cows	..2 at $35	.. ..	70 00	
Calves	..2—1 Heifer at $10, 1 Bull at $15	.. ..	25 00	1,040 00
Mules	..Cart Mule	..Diana	50 00	
Do.	..Foal	..Kim	90 00	140 00
Pigs	..5 Boars	..Berkshire 1	40 00	
		Large Black 3	100 00	
		Blue Boar 1	25 00	
	3 Sows	..Large Black 2	75 00	
		Blue Sow 1		
	Young Sows 3	.. ..	30 00	
	Boars 2	.. ..	20 00	290 00
Goats	..1 Saanen Buck	.. ..	60 00	
Sheep	..4 at $5 and 2 at $3	.. ..	26 00	86 00
Poultry	..Rhode Island Reds—4 Cocks, 31 Hens	.. ..	133 00	133 00
	Plymouth Rocks—4 Cocks, 18 Hens	.. ..		
Do.	..White Leghorns—6 Cocks, 21 Hens	.. ..		
				2,514 00

Rainfall, Government Farm, Tobago, 1927-1928.

Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1927 ..	3.44	5.52	1.41	6.17	3.37	10.90	4.79	2.43	1.65	5.45	8.21	4.95	58.29
1928 ..	2.64	.52	.21	2.04	1.26	3.35	5.50	4.30	8.67	3.29	7.68	1.82	41.28

VETERINARY DIVISION, 1928.

Captain H. V. M. Metivier, Government Veterinary Surgeon, reports as follows:—

GENERAL.—Mr. M. D. Lumsden, B.V.SC., was appointed to take over all veterinary duties in Tobago from 1st April following the resignation of Captain R. J. Link.

Dr. J. L. Shannon, D.V.M., who succeeded Mr. Lumsden at the Government Farm, Trinidad, was also appointed Assistant to the Government Veterinary Surgeon in Trinidad for Veterinary duties.

Animal Husbandry (Dairying, &c.)

The great progress made in the Dairying Industry in the Colony in 1927 was continued in 1928. This Department received through the Canadian Department of Agriculture two consignments of dairy cattle, one in April and the other in October. In the first shipment 10 Holstein (Friesian) heifer calves, 1 Holstein (Friesian) bull calf and 11 Ayrshire heifer calves were consigned to the Trinidad Dairies Limited; 6 Ayrshire heifers in calf, and 3 Holstein (Friesian) heifer calves to the Ste. Madeleine Sugar Company; 2 Ayrshire heifer calves and 1 bull calf of the same breed to Mr. C. Flemming; and 3 Holstein heifer calves and 1 bull calf to the Government Farm. This made a total of 38 head of pure bred cattle. In the October shipment 30 head of pure bred Holstein (Friesian) cattle were received: 11 heifers in calf and 1 bull calf were received for the Trinidad Dairies Limited; 9 heifers in calf and 1 bull calf for Waterloo Estates Limited; 6 heifers in calf for the Ste. Madeleine Sugar Company; and 2 bull calves for the Trinidad Government Farm.

The Trinidad Dairies Limited have built a Model Dairy at Jerningham Junction. Waterloo Estates have erected a similar structure at Exchange Estate, Couva, and the Ste. Madeleine Sugar Company have extended their dairy buildings at Petit Morne Estate. Another Dairy has been established by Mr. S. Liddelow at St. James; this, however, is on a smaller scale than the others above mentioned. With regard to the peasants a great deal of work has been done by the Health Department and this Department in educating the East Indians as to the breeding, feeding and rearing of dairy stock; and lectures with demonstrations were carried out regularly during the year.

Proclaimed Diseases.

ANTHRAX.—One case occurred at Brechin Castle Estate, Couva, and two cases on Exchange Estate, Couva, towards the end of the year: in the latter case the cattle were two imported Holstein heifers that had been stabled in a cattle shed unoccupied by stock for nearly ten years. This showed that Anthrax spores could lie dormant for considerable periods. In both these cases the incontact animals were all vaccinated and no further deaths occurred.

No cases of Anthrax occurred in Venezuelan cattle during their period of detention before slaughter at the Quarantine Station.

FOOT AND MOUTH DISEASE.—This Department has welcomed the establishment of a new quarantine station at the Port of London by the Royal Agricultural Society and the Empire Marketing Board to allow stock from Great Britain to be shipped with safety to the Dominions and to the Colonies. In future cloven footed stock imported from Great Britain which pass through this station will be landed in the Colony without any restrictions.

The question of the introduction of Foot and Mouth Disease into this Colony by means of frozen meat as well as certain feeding stuffs imported from the Argentine Republic was raised with the Secretary of State for the Colonies and the British Minister in the Argentine Republic through the local Government, and this Department was informed that as far as feeding stuffs were concerned that it was impossible for the disease to be introduced into the Colony by this way and with regard to the frozen meat that the precautions taken by the Argentine authorities as well as that of the Supervising British Veterinary Officers in that country were quite satisfactory.

Tuberculosis.—The Government have accepted the recommendations of the Tuberculosis Committee that sat during 1926 and 1927.

(*a*) To amend the Diseases of Animals Ordinance to allow the Government Veterinary Surgeon or any Veterinary Officer authorised by him in writing to carry out the testing of cattle with Tuberculin in all dairies and cow sheds.

(*b*) To control the disease through imported animals by insisting on a certificate that all bovine animals, except those imported for immediate slaughter, should be either from an accredited herd or should have passed successfully the tuberculin test before shipment. This change in the Ordinance and the new regulations will be brought into force early in 1929, when steps will be taken to test at once all dairy cattle that supply milk to Port-of-Spain.

Glanders and Epizootic Lymphangitis.—No cases occurred.

Rabies.—During the year 21 dogs were imported from Great Britain with the regular certificates issued by the Ministry of Agriculture and Fisheries, and were not quarantined. Six dogs were imported from other parts of the world and were detained at the Detention Station for six months. No cases of rabies occurred.

Swine Fever.—No cases occurred.

Non-Proclaimed Diseases.

Contagious Abortion in Cattle.—Very few cases were reported and it was unnecessary to introduce a "Restriction as to Movement" order to control the disease. There are no live stock markets in the Colony and the danger of the disease spreading in this manner is negligible. The Department continues to advocate the three following methods to control the disease:—

(*a*) The establishment of a Maternity ward where all cows in calf are detained for three weeks after calving.

(*b*) The isolation for 60 days of all aborting cows.

(*c*) Aborting cows not to be bred until the period of quarantine has expired.

Bovine Piroplasmosis or Red Water Fever.—With this large importation of dairy cattle from Canada several cases of "Red Water" Fever occurred during the year but the death rate was extremely low. Tryphan blue injected intravenously in the early stages of the disease has given satisfactory results as a curative agent.

Ulcerative Lymphangitis.—The dead vaccine (heat killed) of Preisz Necard bacilli was used on four cases at the Ste. Madeleine Sugar Company and on one at St. Joseph, but the cases were all of some standing and only palliative results were obtained. With the disease in its earliest stages the vaccine would give better results.

Granular Dermic Sores in Donkeys.—This disease is still very prevalent in the Colony especially in the Naparima district. The Veterinary Surgeon of the Ste. Madeleine Sugar Company lectured in that area on this condition and recommended the methods of prevention outlined by this Division in the past. Great stress was laid on three main factors, the dosing of donkeys for worms, the handling of manure (where flies that spread the disease breed), and the dressing of all abrasions and wounds on the skin.

Parasitic Gastritis, Pneumonia, Bronchitis.—These diseases were again kept under control by means of regular monthly dosing with Copper Sulphate following the excellent results obtained on the Government Farm where all the young stock (cattle and goats) receive their monthly drench of bluestone, some of the Sugar Estates are carrying out the same preventive measures with good results.

Diarrhoea in Buffalo Calves.—An acute outbreak of diarrhoea in young Buffalo Calves occurred at Esperanza Estate (California) during the year and was of a bacterial nature. The infection took place when the calves were running with the cows and was most marked during the rainy season. The disease was checked by improving the housing conditions of the calves and allowing them to suckle the cows two or three times daily after the udders had been washed.

Bulbar Paralysis in Stock.—A few isolated cases were reported from the Diego Martin and Maraval districts. A supply of Botulinus Anti Serum was ordered by the Department to deal with these cases, but there were no more outbreaks after the serum arrived.

Strangles and Influenza.—There were several cases of Strangles and Influenza in equidae throughout the Colony especially in animals imported from the Mainland (Venezuela) and in mules from the United States of America.

Tetanus.—Very few cases were reported during the year.

General.

Live Stock Registration Committee.—A Committee was appointed by the Agricultural Society to go into the question of the registration of Live Stock in the Colony owing to the large importation of pure bred dairy cattle from Canada and the great demand for Zebu Cattle from the other West Indian Islands including Cuba.

The Government Veterinary Surgeon was a member of the Committee and attended all the meetings but one. The report of the Committee urging the Registration of all pure bred Zebu Cattle was forwarded to the Agricultural Society, but no further action has, unfortunately, been taken in this matter.

Stray Dogs.—The usual Constabulary campaign of collecting stray dogs was again carried out this year and the work chiefly concentrated in the southern part of the Island—La Brea and San Fernando—the stray dogs were all destroyed by this Division.

Veterinary Lectures.—The Government Veterinary Surgeon visited the Island-Ward of Tobago and lectured to the Agricultural Society in Scarborough on Community Breeding of Livestock with special reference to Tobago. He also addressed the Agricultural Society at the Government Farm, Trinidad, on Cattle Breeding and Milk Production at the October meeting of the Society.

Agricultural and Industrial Exhibition, 1929.—A Committee was appointed early in 1928 by the Agricultural Society to arrange an Exhibition in March, 1929, and the Livestock Representative on this committee was the Government Veterinary Surgeon.

Government Animals.—The transport Train of the Public Works Department at Toco was disbanded and Motor Transport substituted. The surplus animals were transferred to the Tobago and Chaguanas Transport Trains, the Botanical Gardens, and the Government Farm. The Government Veterinary Surgeon visited Government Animals at the following places during the year :—

Toco, Scarborough, Roxborough, Plymouth, Chacachacare, Diego Martin, St. James, St. Ann's, La Brea, San Fernando, Couva, St. Clair, and Constabulary Headquarters.

T. S. P. C. A.—This Division again took an active part in the work of this Society, the Government Veterinary Surgeon acting on the Executive Committee and gave evidence on behalf of the Society in the Magistrate's Court at Port-of-Spain.

Importation of Animals.

The following animals were imported into the Colony and inspected : Horses 83, mules 270, donkeys 20, dogs 27, cattle 7,248, sheep 1,104, pigs 3,317, goats 2,508, deer 3 (Venezuelan). In the above mentioned animals were included 72 head of dairy cattle from Canada, 8 dairy cows from Barbados, 12 thoroughbred horses from England, 2 American saddle horses, 210 Kentucky mules, 2 large American jack donkeys for mule breeding, 3 pure bred pigs from U. S. A., 2 pure bred pigs from Canada, and 21 dogs from England. The Revenue obtained for this work as well as for the supervision of the quarantine station amounted to £1,253. 4s.

PASTURES IN PORT-OF-SPAIN DISTRICT.

QUEEN'S PARK.—The cost of upkeep of the Queen's Park, now only used as a recreation ground, was again high. The mowing machine was used occasionally in the dry months and regularly from the middle of May until the end of the year. This machine has given excellent results, but it is impossible for one such machine to keep down the grass during the wet weather. As on former years the grass was allowed to be cut and carted away by peasants employed in dairying in the suburbs around Port-of-Spain. It is hoped that it will be possible to purchase another mowing machine next year as there are sufficient draught animals available. This plan would enable the grass to be cut more regularly during the rainy season and reduce the number of private cutters allowed on the Savannah.

Grounds were allotted to 22 Cricket Clubs, 8 Football Clubs and 3 Hockey Clubs; the Football Association was allowed grounds for games to be played by the clubs in the two divisions. These various clubs gave a considerable deal of trouble to keep their grounds in order and it will be pointed out in future to all clubs applying for sites the necessity for the proper upkeep of their grounds.

The Trinidad Turf Club carried out extensive improvements to their stands and Paddock, and His Excellency the Governor approved an application from the Club for an extension of the enclosure.

ST. ANN'S AND MUCURAPO PASTURES.—Cattle were pastured throughout the year on the Mucurapo and St. Ann's Pastures; the number of head were, however, considerably reduced during the dry weather. The average number on the Mucurapo Pasture was 65: 40 cows, 15 heifers, and 10 calves; and on the St. Ann's Pasture 30, made up of an equal number of cows, heifers and heifer calves. Cut fodder was again carted to the St. Ann's Pasture regularly throughout the year. The Golf Club has kept their grounds on the Mucurapo Pasture in excellent condition by means of a Fordson Tractor and a mowing machine: the horse-drawn mower used on the Queen's Park was also used on certain portions of the Mucurapo Pasture; one Cricket Club was allotted a ground on the Mucurapo Pasture.

BULLS FOR SERVICE.—Six bulls (one pure bred Holstein and five grade Holsteins) were used for service at the Mucurapo Service Station. Two of the grade bulls were used on the St. Ann's and Mucurapo Pastures and the other bulls stood for service for the cows in the district. 274 cows were bred to grade bulls and 41 of these were returned for second service: the service fee was $1. The pure bred bull was sent up to the Station from the Farm from the 1st August, and it was decided to charge a fee of $2 instead of $3.60 for the bull. By 31st December, 36 cows had been bred to the pure bred bull and 16 returned for a second service. The revenue obtained from the services of the bulls at the station amounted to $346.

Revenue.	£	s.	d.
Mucurapo Pasture	211	0	3
Queen's Park Pasture ..	100	12	7
	£311	12	10

Expenditure.	£	s.	d.
Personal Emoluments ..	125	0	0
Gate Keepers	224	19	1½
Wages (Labour)	460	7	3½
Trees (Upkeep)	39	15	0
Materials	74	17	4
Feed for Stock	159	12	10
Hire of Bulls	45	16	8
	£1,130	8	3

RIVER ESTATE.

Mr. R. O'Connor, The Manager, reports :—

The cacao crop was 1,086 bags of 165 lb. as against the previous year's record crop of 1,318. It was made up as follows : 170,311 lb. Estate cacao, 7,963 lb. black cacao, and 881 lb. passie and wings. The produce was, as usual, disposed of through the Cocoa Planters' Association, who paid an average price of $14.50 per fanega (110 lb.) for Estate cacao up to 30th June, but later prices fell considerably and as a consequence of this, and the comparatively short crop the revenue was much below anticipation. Early in the year a cacao grading machine was purchased and has been in operation continuously. This machine does away with the necessity of hand-cleaning and garbling and turns out the produce in five grades, *i.e.*:

1 grade or larger size beans
2 do. or 2nd do.
3 do. or distinctly small beans
4 do. or wings
5 do. or Passie.

The distinction between 1st and 2nd grades is slight and for market purposes these two can be bulked as one so also with 4th and 5th grades. The proportions work out at roughly 90 per cent. 1st and 2nd grades; 9 per cent. small beans, and 1 per cent. wings and passie. The cost of this machine, obtained through the Cocoa Planters' Association, is about £25, and the cost of operation, inclusive of bagging and sewing, roughly 3½ cents per bag of 165 lb. During the early part of the year the three year old Motor Lorry was sold at auction and realized, after paying auctioneer's commission, the sum of £42 7s. 4d. A new and larger truck was purchased and has been kept in constant service taking in produce and returning with manure from Port-of-Spain.

The total revenue for the year was £4,876 3s. 8½d. and the total expenditure £4,711 11s. 10½d. leaving a surplus of £164 11s. 10d. As explained above revenue from cacao was short, but there has been a fair increase from other crops, such as coffee, limes, oranges and grape fruit. These latter are gradually developing and revenue from them will continue to increase.

The cacao cultivation and that of other crops has been well maintained. The practice of trenching in mulch and manure with reduction of shade is being continued with marked success. The system of trenching as practised at River Estate includes a number of useful cultural operations chief among which are root pruning and destruction of Biche (surface roots), establishment of a new deeper root system, soil aeration, subsoil drainage, moisture conservation, and finally the enrichment of the soil by the addition of large quantities of vegetable matter (mulch, immortelle and other cuttings, pen manure, &c.). This method is as thorough a means of intensive cultivation as is found practicable under existing conditions and the important point with regard to intensive cultivation quite apart from increase of yield is the more effective control of diseases and insect pests of all sorts. It is very noticeable that on all the well worked sections at River Estate the incidence of disease, particularly "Rosellinia" root disease and black-rot of pods, is much less than on the unworked areas. This is also so with regard to insect pests and would appear to be the only effective method of "thrip" control. "Thrips" were very much in evidence during the months of December, 1928, and January and February, 1929, but their activities were confined almost entirely to the unworked or "Cascade" side of the Estate. There were a few instances of "thrip" attacks on the worked areas but these were spasmodic, very limited in extent and always in localities which particularly favoured infestation.

It may safely be stated that the best method of controlling diseases and insect pests is by intensive cultivation.

With regard to the large area under timber I would again stress the necessity for some organised method of control. At present it is impossible to give the adequate amount of supervision necessary for the proper development of this large area which is now at a stage where its treatment within the next few years must determine its ultimate usefulness and value.

Buildings and Stock.—Mention must again be made of the bad condition of the two cacao houses with overseers' quarters and store room below. These latter are particularly cramped and dark, apart from their bad state of repair and the whole structure requires renovation. A new curing house and a three room barrack range are to be constructed during 1929. The three large drying houses, barracks, stables, and Manager's quarters are all in fair order but will require painting and some minor repairs during the coming year. As regards Stock there are only three working mules, two are very old and one may not last out 1929.

The rainfall during the year was 62·85 inches and may be regarded as normal. The dry season was not severe. The usual statements are attached.

Mr. L. Seheult, Cacao Agronomist and Superintendent of River, adds some notes from which the following are taken :—

Intensive work, jointly with moderate pruning repeated when necessary more than once annually in the same field, reduction of shade to improve sanitation and help vegetative and reproductive activity, lessening the number of open drains, where this can reasonably be done, to increase root spread and root capacity, together with careful general maintenance, has again proved useful and profitable at River Estate.

Fields that were worked intensively as far back as five and six years ago continue to yield well, and have been remarkably free of pests which formerly caused much damage to them.

Intensive work with moderation in shading, pruning and draining, is undoubtedly a very rational means of bringing back Cacao fields that have deteriorated. This has been shown not only at River Estate but elsewhere in the Island.

Although intensive work well done appears costly, it is not so in reality, because its good effects last five to six years or more and increased returns are obtained quickly, sometimes within one season.

Labour, although plentiful during the year, has been unsatisfactory, and this must continue as long as only 25 per cent. of the labourers reside on the estate. Many more barrack rooms are required because at least 50 per cent. should be trained or trainable labourers residing on the estate. The unpunctuality of outside labour in turning up to work causes an approximate daily loss of from $2 to $4 during the busiest season.

In regard to Cacao cultivation outside of River there is a more widespread recognition throughout the Colony among both small and big proprietors of the value of intensive work, light pruning, sanitary work and of reducing excessive draining and shading.

Among planters there was a fear that trenching in of large masses of organic matter would induce Rosellinia or root disease. This fear should not deter planters from adopting intensive cultivation, as, the probability of Rosellinia creeping in should be a remote one only, if trenching with drainage connections is intelligently practised ; that is borne out by experience not only at River but also on clay soils in other districts.

The number of planters who take a keen interest in the work that has been shown to be successful on River Estate, and inspect it personally, has grown considerably.

Statement of Revenue and Expenditure for 1928.

Revenue.	£ s. d.	*Expenditure.*	£ s. d.
Cacao	4,564 18 3	A. Personal Emoluments ..	615 0 0
Rent	5 14 7	B. Wages of Extra Employees —Staff	447 10 0
Miscellaneous	297 14 7½	Wages of Extra Employees —Labour	2,579 17 7½
Pasture Fees	7 16 3	C. Travelling and Transport ..	439 18 7
		D. Contingencies Incidental ..	71 3 9½
		E. Miscellaneous Improvement	299 13 11½
		F. Materials	134 14 5½
		G. Stock	123 13 5½
	£4,876 3 8½		£4,711 11 10½

RIVER ESTATE.

Abstract of Expenditure, 1928.

Details.	*Amount.*	
	$ c.	$ c.
STAFF.		
Manager	1,680 00	
Overseers, Drivers and Watchmen	2,997 00	
Manager travelling, Messengers, &c.	362 92	5,039 92
MAINTENANCE.		
Roads, Bridges and Hedges	325 04	
Water service and River	5 58	
Repairs to Buildings	319 69	
Supplies, Tools, Bags, &c.	345 16	
Yard	392 94	
Pasture	52 04	
Destruction of Vermin	119 05	
Sundries—including Telephone Rent, Entertainment of Visitors and Public Services	472 87	2,032 37
TRANSPORT AND STOCK.		
Labour—Stock Keepers, Grass cutters, Grass ields	973 25	
Maintenance—Stock feed, Repairs carts, harness, shoeing, clipping, &c.	716 16	
Produce—Motor lorry including purchase of new lorry, Gasolene, oil, repairs, chauffeur and attendant	2,085 76	3,775 17
NON-RECURRENT.		
New Roads and Bridges	950 75	
Sawing and transport of timber	122 33	1,073 08
COCOA CULTIVATION.		
Draining	178 25	
Cutlassing and weeding	1,665 23	
Pruning	1,042 55	
Supplying	302 00	
Tillage	16 15	
Manuring	1,458 75	
Plant Sanitation—Digging disease trees and burying cocoa shells	380 11	
Shade Control	279 94	
Nurseries—inclusive of Budding work	260 10	5,583 08
MANUFACTURE.		
Reaping	2,193 02	
Curing and Bagging	502 20	2,695 22
FRUIT CULTIVATION.		
Cultivation and Nurseries	415 67	
Reaping	8 60	424 27
COFFEE.		
Cultivation	137 49	
Reaping	110 52	248 01
LIMES.		
Cultivation	105 50	
Reaping	42 21	147 71
TONCA BEANS.		
Cultivation	55 85	
Reaping	2 59	58 44
TIMBER.		
Purchase of Contract and Advances	425 66	
Cultivation and Maintenance of Roads	294 66	720 32
EXPERIMENTAL WORK.		
Superintendent house allowance	600 00	
Labour	196 73	
Materials	21 33	818 06
	$22,615 65	$22,615 65

RIVER ESTATE.

Return of Rainfall, 1928.

Date.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
1 ..	.44	.00	.12	.44	.11	.30	.00	.00	.00	.88	.00	.05	..
2 ..	.05	.00	.05	.00	.00	.00	.95	.00	.00	.00	.00	.00	..
3 ..	.07	.10	.00	.13	.00	.87	.21	.00	.84	.00	.70	.27	..
4 ..	.00	.00	.00	.07	.00	.00	.39	.68	.00	.00	.10	.00	..
5 ..	.45	.55	.00	.01	.00	.00	.31	.00	.00	.00	2.57	.00	..
6 ..	.00	.00	.92	.00	.00	.00	.30	.00	.45	.30	.22	.00	..
7 ..	.57	.00	.00	.00	.00	.00	.00	.00	.62	.51	.00	.00	..
8 ..	.10	.00	.05	.00	.00	.27	.67	.61	.00	.00	1.36	.50	..
9 ..	.00	.17	.00	.00	.00	.00	.00	1.00	.00	.00	.72	.00	..
10 ..	.00	.07	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	..
11 ..	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	..
12 ..	.00	.00	.00	.00	.00	.00	.00	.10	.64	.30	.00	.00	..
13 ..	.00	.08	.13	.19	.40	.00	.22	.25	.00	.85	.40	.31	..
14 ..	.03	.00	.17	.00	.00	.00	.00	.00	.00	.22	.10	1.93	..
15 ..	.05	.00	.00	.00	.00	.48	.20	.05	.00	.00	.00	.33	..
16 ..	.08	.00	.00	.00	.00	.39	1.70	.03	.00	.00	.10	.50	..
17 ..	.00	.00	.00	.00	.00	.00	.06	.13	.00	.31	.00	.03	..
18 ..	.00	.00	.00	.01	.00	.00	.65	.18	.29	.00	.00	.00	..
19 ..	.59	.00	.00	.06	.00	.00	.41	.03	.37	.00	.00	.36	..
20 ..	1.97	.00	.00	.00	.00	.00	1.24	.00	.13	.00	.83	.13	..
21 ..	.35	.00	.00	.00	.00	.96	.00	.31	.00	.00	.08	.00	..
22 ..	.00	.00	.00	.00	.00	.22	1.06	.97	.00	.00	.15	.00	..
23 ..	.00	.00	.00	.22	.00	.00	.00	.10	1.03	.00	.19	.11	..
24 ..	.00	.08	.00	.33	.00	.73	.07	.75	.37	.00	.72	.00	..
25 ..	.12	.15	.16	.02	.00	.68	.51	.30	1.62	.00	.95	.04	..
26 ..	.15	.00	.00	.01	.00	.20	.67	.19	.38	1.40	.10	.00	..
27 ..	.00	.08	.00	.00	.14	.00	.26	.40	1.72	.91	.31	.00	..
28 ..	.00	.00	.00	.00	.00	.49	.00	.27	.56	.41	.49	.00	..
29 ..	.10	.00	.00	.00	.00	.20	.36	.00	.00	.00	.00	.30	..
30 ..	.00	..	.00	.00	.00	.00	.00	.00	.00	.12	.00	.00	..
31 ..	.15	..	.00	..	.00	.00	.00	.00	..	.00	..	.00	..
Totals..	5.27	1.28	1. 0	1.49	.65	5.79	10.24	6.35	9.02	6.21	10.09	4.86	62.85

RIVER ESTATE.

Annual Yield per acre for each Field of Cacao, 1924 to 1928.

No. of Field.	No. of Bearing trees.	Half trees.	Quarter trees.	Supply trees.	Missing trees.	Total.	Age of trees.	Planting distance.	Acreage.	Yield. 1924. No. of Bags of 165 lb.	1924. No. of Bags per Acre.	1925. No. of Bags of 165 lb.	1925. No. of Bags per Acre.	1926. No. of Bags of 165 lb.	1926. No. of Bags per Acre.	1927. No. of Bags of 165 lb.	1927. No. of Bags per Acre.	1928. No. of Bags of 165 lb.	1928. No. of Bags per Acre.	Average Bags per acre for 5 years 1924-28.
1	4,862	283	645	649	74	6,513	21-27	12 x 12	21.7	37.33	1.7	44.00	2.0	27.33	1.2	54.66	2.5	36.66	1.6	1.8
2	2,020	126	549	1,345	83	4,123	51-87	15 x 15	21.7	30.66	1.4	48.00	2.2	31.33	1.4	46.66	2.1	32.00	1.4	1.7
3A	1,499	182	272	677	30	2,660	51-57	15 x 15	14.0	25.33	1.8	38.66	2.7	28.00	2.0	41 33	2.8	23.33	1.6	2.2
3B	1,383	221	339	280	7	2,230	51-57	15 x 15	11.7	21.33	1.8	30.66	2.6	19.33	1.6	32.00	2.7	24.00	2.0	2.1
4	5,141	257	430	62	1,128	7,018	41-52	12 x 12	23.3	48.33	2.0	56.00	2.4	32.66	1.4	45.33	1.9	32.66	1.4	1.5
5	2,082	170	343	334	13	2,942	51-57	15 x 15	15.4	50.33	3.2	60.66	3.9	43.33	2.8	67.33	4.3	45.66	2.9	3.4
6	5,452	337	436	769	46	7,040	21-27	12 x 12	23.4	61.33	2.6	92.66	3.9	52.00	2.2	97.33	4.1	59.33	2.5	3.1
7	3,447	477	545	422	56	4,947	21-27	12 x 12	16.4	44.00	2.6	60.66	3.7	35.33	2.1	73.33	4.4	56.66	3.4	3.2
8	5,275	910	1,094	182	684	8,145	21-27	12 x 12	27.1	51.39	1.8	69.33	2.5	54.66	2.0	101 33	3.7	81.33	3.0	2.6
9	4,327	866	1,044	1,231	60	7,528	21-27	12 x 12	25.0	53.33	2.1	48.66	1.9	46.00	1.8	73 33	2.9	54.66	2.1	2.2
10	3,016	414	905	536	119	4,990	21-27	12 x 12	16.6	22.66	1.3	21.33	1.2	22.00	1.3	33.33	2.0	30.00	1.8	1.5
11	2,070	161	510	398	63	3,202	21-27	12 x 12	10.6	14.66	1.3	16.00	1.5	13.33	1.2	20.00	1.8	19.33	1.8	1.5
12	3,130	621	1,399	89	1,113	6,352	21-32	12 x 12	21.1	21.33	1.0	23.33	1.1	16.66	.7	32.00	1.5	27.33	1.2	
13	3,438	279	740	72	758	5,287	21-32	12 x 12	17.6	44.00	2.5	64.00	3.6	46.66	2.6	66.66	3.7	63.33	3.5	3.2
14	989	293	425	..	400	2,107	51-57	12 x 12	7.0	6.66	.9	6.66	.9	6.66	.9	10.00	1.4	8.00	1.1	1.0
15	1,810	225	334	..	292	2,661	51-57	12 x 12	8.8	6.00	.6	6.66	.7	5.33	.6	8.00	.9	11.33	1.2	.8
16	3,457	346	987	32	954	5,776	21-57	12 x 12	19.2	16.00	.8	24.66	1.2	20.00	1.0	30.00	1.5	36.66	1.9	1.2
17	4,557	597	1,269	153	657	7,233	21-27	12 x 12	24.1	38.00	1.5	44.00	1.8	21.33	.8	46.66	1.9	40.00	1.6	1.5
18	3,038	628	938	84	565	5,253	16-27	12 x 12	17.5	37.33	2.1	32.66	1.8	33.33	1.9	52 00	2.9	48.00	2.7	2.3
19	4,056	369	380	220	68	5,093	16-27	12 x 12	16.9	49.33	2.9	48.66	2.8	35.33	2.0	65.33	3.8	58.00	3.4	3.0
20	5,167	332	331	395	26	6,251	16-27	12 x 12	20.8	58.00	2.7	72.00	3.4	50.00	2.4	74.66	3.5	80.00	3.8	3.1
21	3,561	264	295	584	239	4,943	16-27	12 x 12	16.4	45.33	2.7	60.66	3.7	38.66	2.3	53.33	3.2	48.00	2.9	3.0
22	5,184	1,231	1,276	48	758	8,497	16-27	12 x 12	28.3	54.66	1.9	92.00	3.2	61.33	2.1	76.66	2 7	76.66	2.7	2.5
23	3,227	554	767	30	322	4,900	16-27	12 x 12	16.3	38.28	2.3	59.83	3.5	46.66	2.8	62.00	3.8	49.33	3.0	3.1
24	1,696	612	1,457	287	636	4,688	16-27	12 x 12	15.6	20.66	1.3	24.00	1.5	15.33	.9	16.66	1.0	14.66	.9	1.1
25	2,027	506	366	190	236	3,325	9-22	12 x 12	11.0	22.00	2.0	24.00	2.1	26.66	2.4	38.66	3.5	28.66	2.6	2.5
Totals	85,911	11,261	18,076	9,069	9,387	133,704	..	..	466.5	918.26	..	1,169.24	..	829.24	..	1,318.58	..	1,085.58	..	..
Total Average Yield per acre ..	..	..	..	..	..	..	..	..	..	..	1.9	..	2.5	..	1.8	..	2.8	..	2.3	..

PLANT PATHOLOGY.

Mr. F. Stell, Mycologist, makes the following report on Plant Diseases :—

In general, the weather conditions during the year more closely approximated to the normal than was the case in the previous twelve months. Still, somewhat abnormal conditions were prevalent at two periods. (*a*) the dry season started late and was long drawn out : this had an adverse effect on the cane and fodder crops (*see* later references) ; (*b*) heavy rains were experienced, accompanied by floods towards the end of the year ; these were responsible for some loss of crop in several of the cacao growing districts.

Cacao.

Witch-Broom Disease.—The event of the year was the discovery of Witch-Broom disease due to *Marasmius perniciosus*. This affection, which has been responsible for great damage on the mainland of South America, was found to be present in two areas, *viz.*: L'Ebranche Valley in South Manzanilla and in the district between Guaico and Tamana. On the whole, the infestation may be said to be comparatively mild at present. The heaviest infestation is along the margins of streams where the humidity is highest. As one recedes from these margins, the incidence of the disease diminishes. The Government took early action, and since the time of the discovery up to the present, Government labourers and supervisors have been continuously employed in control work. This work has been strikingly successful, but it is obvious that an indefinite continuance of operations will be necessary if the work is to be effective. It is regrettable that more reliance cannot be placed on the cacao planters—particularly the small holders—to busy themselves in this task : hence it is strongly recommended that the Government should purchase and operate the main areas of infestation, the lands of which are now in the possession of small proprietors. A notable feature of the disease is that vegetative infestation is very common whilst the incidence on the pods is slow. This is probably due to the disease being a fairly recent introduction and it is reasonable to assume that if the vegetative phase of the disease is not thoroughly controlled, subsequently crop losses will begin to increase. Every effort has been made to give publicity to the disease to planters through the medium of the press, meetings, literature, exhibits of diseased material, &c. and the writer is confident that if the recommended control measures are supplied by all concerned, the losses will be minimized.

Black Pod.—In some years the Black Pod disease caused by *Phytophthora* sp. is responsible for much damage. There are two ways of handling the problem. (1) Spraying, (2) Cultural work. In most areas spraying would be uneconomical on account of low cropping combined with labour shortage, difficulty of access to the trees, &c. It is only on properties where cropping is high and other facilities readily available that a spraying campaign would be useful. But the cultural aspect of the problem is one which all planters could profitably pursue. It is well-known that in districts where shade has been gradually reduced to a point consistent with the requirements of the crop, then a marked reduction of Black Pod has resulted. A bad feature of the typical shade trees is that they attain their maximum utility fairly early in the life of a cacao estate ; after that they continue to grow and produce excessive shade. In recent years a considerable amount of shade reduction has been done by some planters by applying the poison, Sodium arsenite, to shade trees. Planters are advised to study each field on its merits before embarking on this scheme. It is necessary to know the land contours thoroughly ; also the possibility of thrips, cacao beetle, and wind complications. But it is now quite clear that the most effective way of dealing with Black Pod is to make agricultural adjustments.

Root Diseases.—Root disease, caused by *Rosellinia* sp. and *Sphoerostilbe* sp., still causes some loss of trees. But where the estate lay-out is good, *i.e.*, where the drainage system is well established, then it is a fairly easy task to delimit the disease. It is in areas where the lay-out is defective and supervision not of the best that Root disease does most damage.

Sugar Cane.

MOSAIC.—There are two large areas where this virus disease exists. (1) The Northern sugar cane belt (2) the Couva belt. In the former area, the affection has been present for about ten years ; in the latter district the disease is of about two years' duration. Since the discovery of this affection continuous action has been taken to control it. Cane farmers are numerous on these areas and they are slow to appreciate the importance of an affection of this kind. Moreover, many of them are engaged in other work, the cane-farming being merely a side-line. The most effective work in controlling the trouble is to urge the planters to make quite sure that the " cuttings " used for planting are not diseased. If this is done then one can expect the incidence to be mild and definitely limited in extent.

A somewhat novel phenomenon presented itself on one large estate and was reported to the Department as an " unknown " disease. A number of stools (Uba) died in groups ; also scattered plants were dying in the same field. In addition, numbers of plants had a marked spotting of the foliage. These leaf blotches were of a blood-red colour. The affected tissues were dead. But the blotches alternated with healthy tissues the whole forming a definite pattern on the leaves. This pattern resulted from the over-lapping of the leaves and gave the clue to the cause of the trouble. All the symptoms suggested that some poison had been deposited on the canes, and later it was determined that these canes had been dusted with Cyanogas which is a valuable preventative for Froghopper blight. In this instance the labourers had accidentally dusted the leaves of the canes instead of the soil surface.

As stated previously, the dry season after commencing late, was somewhat protracted. This was responsible for the tardy growth of ratoons and in some cases small areas had a definite set-back. Another feature of some significance was the adverse effect of the temporary drought on patches of land carrying fodder crops. One field of Elephant grass in Port-of-Spain was particularly bad. Part of the cause of this was that the reaping was faulty, the grass being cut at too high a level. The grass appeared to be dying and the owner wondered what disease had taken possession. The real trouble was the drought accentuated by bad reaping. With the advent of the wet season, the fodder crops and the canes recovered.

Coconuts.

WILT.—Of the diseases of this crop, the *Wilt* affection takes an important place. It is only in recent years that this trouble has been put in true perspective. In earlier times nearly all the affections of the coconut were called bud-rot. But by a process of elimination, it is now known that *Wilt* is an affection having definite symptoms. These symptoms have been recorded in previous reports, also publicity has been given to them in the Press and elsewhere. It is well to realize that the affection is almost entirely confined to soils having a high clay content. Such soils are apt to be water-logged and in drought periods they " dry out " to an extent which is inimical to the trees. It appears, therefore, that the physical and possibly the chemical composition of such soils is unsuitable for mature coconuts. In the young stages the trees apparently thrive in these lands, but as they age and bear crops and the roots seek a wider and deeper root-range, a gradual wilting sets in and the trees die. It is most important that prospective growers of this crop should carefully select the soil, as by this means much trouble in after years will be avoided. There is no doubt that much of the land planted in coconuts is far from ideal and is primarily responsible for this affection.

RED-RING.—Of the other affections of the coconut the Red-Ring is still fairly prevalent. This affection is nowadays generally well known by the planters. The great difficulty is to get prompt treatment when a diseased tree presents itself. It is now found that it is better to leave the diseased tree intact after severing the leaves, and scorch the stem tissues by burning dry material placed around the trunk. But the most important measure of control is to isolate the affected tree or trees by trenching. This has been shown to be effective in limiting the spread of the disease.

OTHER DISEASES.—Little-Leaf and Bleeding Stem are not very much in evidence. Appropriate remedies for these affections are constantly being announced to the planters.

Coffee.

THREAD-BLIGHT.—Thread-Blight, caused by the fungus *Pellicularia Koleroga*, has been particularly bad during the year. The highest incidence is found in old neglected bushes. Usually these are the Arabica variety, many old plantings of which are to be found in several parts of the Colony. The first requirement in treating this affection is to thin out the plants where the spacing is obviously too close. A second measure is to reduce humidity where the bushes are excessively shaded. Then again, many bushes are old and should be cut back and allowed to ratoon or replaced by new plants. Where the trouble persists after the above adjustments have been made the planter can spray the bushes. But it is useless to spray until the fundamental requirements of the bushes as to spacing, shade, pruning, &c., have received attention.

LEAF DISEASE.—In the Northern Range the Arabica variety is also subject to the parasite *Omphalia flavida*. Here again the best control measure is to ventilate the bushes by reducing shade; cleaning and pruning the bushes; and thus promoting a less humid atmosphere about the crop.

NEMATODES.—In all varieties of coffee one finds a low evidence of nematode infestation of the roots. This is quite sporadic and cannot be said to be of economic importance. What really happens is that the bushes become debilitated from one or several reasons and then the nematodes gain a footing on the feeding roots and help in killing a particular bush or bushes.

Sclerotium coffoe colum. The parasite which attacks the Liberian group of coffee has not been much in evidence. This disease threatens to do serious damage on bushes planted in regions of high rainfall. Where the disease occurs, it is necessary to reduce shade to a minimum and it should be useful to spray the bushes to prevent the onset of the trouble.

Visits.

Numerous visits were made to estates, large and small, and advice given on diseases and their control. Much time was spent in the Witch-broom areas. Tobago was visited and a considerable number of properties inspected. Numerous specimens of diseased plants were sent to the office by planters for diagnosis and suggestions for treatment.

Importations.

The following consignments were dealt with during the year :—

	No.
Seeds and Plants	653
Bags	507
Consignments destroyed	4
Consignments disinfected	2
Total	1,166

Plant Protection Ordinance.

The Chief Inspector, Mr. Buthn, paid visits with the Agricultural Advisers in respect of work under the Ordinance.

The following is the record of work on parasol ants mostly carried out by the Advisers :—

County, &c.	*No. of Nests Destroyed.*	*Area Square feet.*	*Carbon bisulphide used Ounces.*
Nariva-Mayaro	68	66,228	1,295
St. Patrick	97	94,406	2,626
St. George	156	311,226	7,050
Caroni	120	207,227	4,813
St. Andrew St. David	72	138,100	2,988
Tobago	52	59,617	1,440
Victoria	29	32,600	936
Port-of-Spain	32	—	—
Totals	626	909,404	21,148

Notices served on private persons	17
Notices served on public bodies	7

CACAO BEETLE.—The special campaign was continued under Mr. Foster as Supervising Inspector with a staff of twelve Assistant Inspectors. During the year the total area visited (many properties several times) was 343,380 acres and 2,957,590 beetles were returned as having been destroyed. Compulsory action was only necessary in six cases. Every effort is made to induce cultivators to pay attention to shade and general cultural conditions, the collecting of beetles and larvae alone being merely a palliative.

AGRICULTURAL EDUCATION.

AGRICULTURAL ADVISERS' WORK.—The seven Agricultural Advisers have carried out, as in the past, their main duty of giving advice to all classes of farmers.

In addition they have helped to administer the regulations under the Plant Protection Ordinance, have visited school gardens and carried out inspection for the Agricultural Bank.

The following paragraphs summarize their work.

St. Andrew and St. David.

CROPS.—The cocoa crop was only a fair one. Coffee was good and coconuts did very well. Rice was poor probably owing to the uneven rainfall.

DISEASES, PESTS, &c.—A great deal of attention was, of necessity, given to Witch-Broom disease of cocoa which broke out in the Manzanilla area. Cocoa Beetle has not been serious. The incidence of Black Pod shows the need for continuous effort in inculcating into the farmers a better standard of culture.

MISCELLANEOUS.—Coconuts show the results of planting on poor or unsuitable soils in many cases. The standard of work in school gardens showed a slight improvement. Work for the Agricultural Bank continued to take up a lot of time.

Nariva-Mayaro.

CROPS.—The cocoa crop was not heavy but light picking continued throughout the year. The cane crop was good. Rice was fair but harvesting was hampered by heavy rains. The supply of ground provisions was adequate.

DISEASES AND PESTS.—Cocoa Beetles, numerous at the beginning of the year, fell off steadily. No Witch-Broom was discovered during the year.

MISCELLANEOUS.—Crown Lands are steadily coming under cultivation. In school gardens the standard of work continues to be poor.

St. Patrick.

CROPS.—There was a very good cocoa crop. Heavy rain checked rice at first but a good crop developed. A fairly large area of young coconuts are coming into bearing. Sugar Cane was normal.

DISEASES AND PESTS.—Cocoa Beetles were bad partly owing to the opening up of new oil lands. Bird Vine, and Love Vine called for the serving of 79 orders. Black Pod was very bad due to overlading.

MISCELLANEOUS.—Little interest was shown in school gardens and the standard of work was poor.

St. George.

CROPS.—Cocoa was below average. The average has decreased. Coffee was above average. Among canes B. H. 10 (12) is steadily improving its lead. The planting of Grape Fruit continues.

DISEASES AND PESTS.—Co-operation on the part of farmers enabled the "rogueing" in Mosaic Work on canes more easily. Cocoa Beetles were not troublesome. Thrips did a good deal of damage. Rosellinia root disease is still common. Black Pod continues to take a heavy toll of the crop.

MISCELLANEOUS.—The usual work for the Agricultural Bank and in connection with School Gardens was carried out.

Caroni.

CROPS.—The cocoa crop did not reach expectation. Coffee was well above average. Ground Provisions were plentiful but rice was poor.

DISEASES AND PESTS.—Cocoa Beetles are still decreasing.

Coconut Blight is spreading rapidly. Work on Mosaic of Cane was carried out over some hundred odd acres.

Victoria.

CROPS.—The cocoa crop was good and coffee very poor. Planting of coffee continues. The supply of Ground Provisions was good except for eddoes. Rice was badly checked by unsuitable weather.

DISEASES AND PESTS.—Cocoa Beetles decreased. Witch-Broom has not been discovered to date. Black Pod continued to take a heavy toll of the crop. Wide areas show the unsuitability of the soil chosen for the coconut.

MISCELLANEOUS.—School Gardens were satisfactory. Several inspections for the Agricultural Bank were carried out.

Tobago.

CROPS.—The weather suited cocoa in the first half of the year but heavy rains increased Black Pod losses towards the end. Sugar cane was fair. Ground Provisions have, on the whole, been plentiful. Coffee cultivation is steadily increasing.

DISEASES AND PESTS.—Black Pod is again the worst disease from the point of view of direct loss of crop.

MISCELLANEOUS.—The Agricultural Credit Society movement continues to make healthy progress. There are now twelve societies working in the island.

COCOA FERMENTARY.—The Pembroke Fermentary has successfully commenced its work. These signs of the awakening of a spirit of co-operation in Tobago are most encouraging and can but lead to better returns from agricultural practice.

The interest in cover crops in coconuts is a progressive sign.

W. G. FREEMAN,
Director of Agriculture.

TABLE I.—Revenue and Expenditure.

		Expenditure. £ s. d.		*Revenue.* £ s. d.
HEAD OFFICE :				
Personal Emoluments		6,164 5 0		93 15 0
Travelling and Other Charges		1,046 14 9½		20 0 0
Laboratory Expenses		50 11 3		
Froghopper Investigation		4,036 8 11	(1)	1,388 18 6
Mongoose Campaign		1,034 11 0	(1)	463 13 5
Cacao Beetle Campaign		1,973 11 10		
Witch-Broom Disease		623 9 3½		
BOTANICAL DEPARTMENT, TRINIDAD :				
Personal Emoluments		934 17 10		
Maintenance and Improvements, Royal Botanic Gardens and St. Clair Experiment Station		1,956 12 2		1,408 0 5
Care of Trees on Government Lands		89 6 3½		
Maintenance, Red House Grounds		63 16 9		
Other Charges		375 5 3½		
BOTANICAL DEPARTMENT, TOBAGO :				
Personal Emoluments, Travelling		331 5 0		
Maintenance, Botanic Station and Government House Grounds		304 13 4		68 11 0
RIVER ESTATE :				
Personal Emoluments		615 0 0		
General Maintenance, &c.		3,796 17 11		4,876 3 8½
Improvements		299 13 11½		
ST. AUGUSTINE EXPERIMENT STATION :				
Personal Emoluments		372 0 0		
Maintenance, Cultivation of Crops, &c.		2,662 11 1½		1,414 8 8½
GOVERNMENT FARM, TRINIDAD :				
Personal Emoluments		512 10 8		
Maintenance		4,722 18 5½		
Purchase of Stock (Trinidad and Tobago)		584 1 2½		7,527 10 3½
GOVERNMENT FARM, TOBAGO :				
Personal Emoluments		190 7 6		
Maintenance		500 10 2		388 6 6½
GOVERNMENT VETERINARY SURGEON :				
Assistant Examiners and Contingencies		78 5 4½		1,253 4 0
QUEEN'S PARK AND PASTURES :				
Personal Emoluments		125 0 0		
Maintenance		1,005 8 3		311 12 10
AGRICULTURAL EDUCATION :				
Personal Emoluments, Travelling, &c.		2,485 19 7½		
PLANT PROTECTION ORDINANCE :				
Travelling, &c.		58 18 3½		
Destruction of Pests		307 10 6½		
AGRICULTURAL CREDIT SOCIETIES :				
Personal Emoluments, Travelling, &c.		124 0 5		
		£37,427 2 3		£19,114 4 5

(1) Contributions by the Sugar Manufacturers' Association.

TABLE II.—Principal Agricultural Exports, Trinidad and Tobago.

	1927.		1928.	
	Quantity.	Value.	Quantity.	Value.
CACAO :		£		£
Raw Cacao	51,934,857 lb.	1,671,883	58,008,156 lb.	1,651,179
SUGAR CANE AND PRODUCTS :				
Vacuum pan, Grey Crystal	28,315¼ tons	514,946	57,253½ tons	889,116
Do. White Crystal	3¼ tons	38	½ ton	8
Do. Yellow Crystal	12,814½ tons	235,842	15,397½ tons	291,980
Molasses Crystal	570 tons	9,972	1,314¾ tons	18,211
Muscovado Sugar	102⅛ tons	1,548	146 tons	2,162
Molasses	1,188,840 gals.	14,471	1,622,018 gals.	16,913
Rum	35,699 gals.	8,155	55,088 gals.	12,157
Bitters	55,152 gals.	79,570	49,236 gals.	70,101
COCONUT AND PRODUCTS :				
Coconuts	6,463,765 No.	32,298	6,799,655 No.	34,824
Copra	12,498,983 lb.	146,895	21,351,860 lb.	227,555
Coconut Oil	58,061 gals.	11,102	65,285 gals.	11,860
COFFEE :				
Raw Coffee	163,920 lb.	7,238	264,918 lb.	10,869
RUBBER :				
Raw Rubber	141,887 lb.	11,625	72,641 lb.	6,050
LIMES :				
Lime Juice	4,488 gals.	1,154	5,653 gals.	1,487
Lime Oil	104 gals.	1,454	..	..
GRAIN, PULSE, STARCHES, &C. :				
Corn (Maize)	205,300 lb.	985	22,917 lb.	150
Peas and Beans	210,528 lb.	1,712	234,034 lb.	2,698
FRUIT :				
Oranges	2,602,419 No.	2,760	311,070 No.	477
Other kinds	..	1,779	..	880
MISCELLANEOUS :				
Plants and seeds	..	1,289	..	1,145
Spices (Nutmegs)	30,237 lb.	1,299	17,048 lb.	778
Honey	22,111 lb.	301	27,630 lb.	322
FOREST PRODUCTS :				
Cedar (undressed)	62,282 cu.ft.	8,082	32,124 cu.ft.	4,162
LIVE STOCK AND ANIMAL PRODUCTS :				
Live Stock	71 No.	* 1,562	66 No.	2,300
Hides and Skins	8,298 No.	7,103	5,565 No.	1,958
Leather (unmanufactured)	8,312 lb.	696	8,439 lb.	892
		2,775,779		3,260,234

* Exclusive of Poultry and Game valued at £13.

TABLE III.—ANNUAL RAINFALL 1862 TO 1928, PORT-OF-SPAIN, TRINIDAD.

1862 to 1899 at the Royal Botanic Gardens. January, 1900 onwards at the closely adjacent St. Clair Experiment Station.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Rainfall
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Inches.
1862 ..	..	.66	.77	.25	1.41	8.47	10.36	9.57	11.97	6.60	10.06	3.03	63.15
1863 ..	1.54	2.71	1.45	.85	1.26	9.12	10.12	10.53	12.11	6.24	4.30	6.57	66.80
1864 ..	2.51	.53	.36	.04	8.15	4.96	7.17	12.06	8.04	6.53	5.94	6.61	62.90
1865 ..	2.62	3.20	1.07	7.98	3.22	5.64	10.35	14.83	7.32	14.62	4.81	9.62	85.28
1866 ..	2.24	3.91	1.44	1.09	1.45	6.59	7.83	12.34	5.87	10.11	8.17	6.82	67.86
1867 ..	1.31	6.36	.83	1.32	2.33	5.30	12.20	15.21	10.45	7.87	.67	2.71	66.56
1868 ..	2.06	.82	3.20	.64	4.17	7.78	11.35	6.73	5.46	4.66	8.31	1.03	56.21
1869 ..	.08	.93	.74	.41	.69	5.52	10.17	8.74	8.86	5.15	6.30	5.87	53.46
1870 ..	2.61	.56	1.46	1.51	4.65	8.81	11.91	9.00	10.63	3.98	5.94	8.29	69.35
1871 ..	6.62	1.40	2.89	.92	3.97	8.84	11.73	12.97	7.87	4.37	10.73	3.27	75.58
1872 ..	1.45	.07	.74	.39	3.14	7.09	5.45	10.82	3.07	4.80	9.89	3.04	49·95
1873 ..	1.78	1.08	1.98	.53	..	4.31	5.04	8.37	5.80	10.34	3.48	1.31	44.02
1874 ..	3.47	1.96	3.67	5.16	2.51	12.28	12.28	11.20	9.38	6.42	3.66	4.29	76.28
1875 ..	3.39	.91	.56	.42	2.61	4.15	12.62	7.22	11.95	10.85	3.74	2.48	60.90
1876 ..	3.26	1.03	1.78	1.67	6.65	11.17	12.23	15.18	12.03	7.04	5.95	3.96	81.95
1877 ..	2.14	..	7.46	3.38	3.19	8.43	8.35	12.94	6.39	6.68	7.66	5.48	72.10
1878 ..	3.44	.70	..	3.22	4.99	5.78	5.42	8.88	11.15	5.89	8.72	3.05	61.24
1879 ..	1.52	2.76	4.56	3.03	3.08	14.92	6.86	10.35	6.15	3.54	4.28	4.38	65.43
1880 ..	11.72	6.53	.67	2.32	3.90	7.83	6.30	17.39	7.47	5.74	10.51	1.96	82.34
1881 ..	.57	.65	.23	1.60	4.66	11.05	7.82	10.90	10.59	3.36	12.06	2.23	65.72
1882 ..	1.33	2.38	.73	1.57	3.74	6.33	5.93	8.40	4.93	5.86	10.29	1.50	52.99
1883 ..	1.56	.71	.26	3.37	5.89	10.91	13.66	10.26	5.53	3.99	6.06	8.30	70.50
1884 ..	3.43	2.50	4.40	1.51	2.91	6.84	5.71	8.70	5.03	5.05	5.14	5.66	56.88
1885 ..	1.30	.89	1.49	.43	5.27	3.44	5.87	4.56	6.08	4.08	5.37	4.44	43.22
1886 ..	3.32	1.97	3.27	3.83	4.49	9.70	17.48	8.15	6.73	12.59	8.54	6.75	86.82
1887 ..	2.69	1.46	1.67	1.08	3.98	7.40	5.51	9.93	5.07	5.84	7.60	11.86	64.09
1888 ..	8.37	1.79	2.41	2.28	3.46	11.92	6.89	7.02	5.53	5.06	7.76	2.95	65.44
1889 ..	.94	.85	4.16	1.05	6.34	11.66	12.14	11.73	3.76	6.30	7.38	7.48	73.79
1890 ..	7.76	.51	2.09	7.62	5.14	9.68	12.89	11.65	3.37	10.98	5.93	5.28	82.90
1891 ..	3.17	.92	.03	1.44	2.54	5.54	11.88	4.26	7.44	5.77	6.66	4.09	53.74
1892 ..	1.93	2.19	1.85	7.59	11.55	16.26	15.55	9.21	3.57	11.49	5.40	4.69	91.28
1893 ..	3.43	1.85	.19	3.61	11.35	10.19	13.28	16.32	11.73	5.47	7.84	7.23	92.49
1894 ..	3.22	2.36	3.12	1.22	2.69	3.26	4.53	12.06	5.48	3.93	7.28	3.16	52.31
1895 ..	2.52	1.33	2.27	2.52	2.11	5.00	2.57	4.86	5.69	10.89	15.15	7.32	62.23
1896 ..	7.08	.88	1.59	2.33	1.62	10.29	6.35	7.66	6.46	6.05	9.81	6.33	66.45
1897 ..	1.67	.75	3.96	.26	5.58	11.19	13.88	7.90	9.83	8.87	9.39	4.40	77.68
1898 ..	3.05	2.18	2.10	1.17	1.49	6.46	5.87	10.55	7.13	6.15	9.13	3.57	58.85
1899 ..	1.95	1.82	1.00	.75	.52	7.63	4.44	8.45	2.18	6.34	8.07	3.61	46.76
1900 ..	3.56	.76	2.72	4.10	4.14	12.99	7.95	11.07	5.52	6.53	5.41	2.61	67.36
1901 ..	1.95	1.51	1.85	.35	6.45	9.21	8.38	7.53	4.26	4.97	7.93	4.83	59.22
1902 ..	2.56	.51	1.18	1.78	2.14	10.05	5.20	11.67	7.22	7.40	2.74	2.89	55.34
1903 ..	1.51	.68	1.54	2.17	.95	5.42	9.40	9.45	11.41	2.12	2.59	4.20	51.44
1904 ..	3.00	2.56	4.24	2.50	2.76	6.23	8.03	4.72	8.81	5.65	3.61	4.32	56.43
1905 ..	2.41	.59	3.74	1.79	4.34	6.01	9.49	11.09	10.43	6.94	10.69	4.16	71.68
1906 ..	.43	.50	.73	.46	7.96	10.95	11.42	8.55	6.54	6.80	5.00	5.64	64.98
1907 ..	5.22	.44	1.71	.09	4.58	11.01	11.02	5.77	7.76	7.65	10.69	4.10	70.04
1908 ..	.75	.45	1.79	.95	5.82	5.22	5.87	7.72	5.45	5.45	2.65	8.68	50.80
1909 ..	5.69	2.43	1.15	1.78	3.87	8.31	10.72	6.29	6.95	7.15	3.93	6.31	64.58
1910 ..	2.79	4.38	1.75	2.01	2.76	6.34	6.40	13.89	8.27	9.21	8.49	1.90	68.19
1911 ..	1.61	1.51	1.86	.74	1.27	7.15	5.20	13.68	4.03	10.22	3.57	3.53	54.37
1912 ..	.62	Nil.	.74	.03	2.18	7.54	12.16	5.56	5.87	2.73	6.28	5.64	49.35
1913 ..	2.80	.50	1.42	.42	1.79	2.80	2.86	6.48	6.52	3.51	8.61	1.82	39.53
1914 ..	.50	.61	1.28	1.01	2.05	7.34	5.05	9.15	7.80	6.14	7.61	5.58	54.12
1915 ..	2.10	.66	..	2.63	2.76	7.05	12.76	5.27	4.21	9.28	7.84	1.75	56.31
1916 ..	5.29	1.35	1.57	1.91	.94	10.30	8.04	11.57	10.78	6.68	9.32	1.98	69.73
1917 ..	1.17	3.06	1.38	.50	4.24	6.30	10.13	9.96	7.24	5.43	6.61	8.22	64.24
1918 ..	3.15	1.18	1.48	1.27	2.94	5.87	14.42	8.56	8.93	5.51	7.56	3.85	64.72
1919 ..	.62	..	1.78	1.67	3.50	6.78	5.17	6.82	7.96	7.79	8.42	6.67	57.18
1920 ..	1.39	1.66	.94	.28	.56	4.13	4.93	6.70	10.98	5.74	6.03	1.60	44.94
1921 ..	2.43	1.60	5.03	4.09	1.43	9.91	10.06	10.30	10.17	6.53	7.71	6.25	75.51
1922 ..	4.01	1.13	1.41	2.39	2.18	6.10	5.06	8.35	6.49	2.92	11.17	7.10	58.31
1923 ..	1.91	1.66	.96	2.97	1.46	3.48	10.76	9.37	6.23	4.41	7.38	7.32	57.91
1924 ..	1.54	.90	.14	1.11	.73	4.95	7.53	7.27	4.59	7.81	8.56	2.15	47.28
1925 ..	1.77	1.06	2.67	.10	1.21	4.20	7.58	8.87	6.37	5.85	5.36	4.36	49.40
1926 ..	.69	.39	.54	.23	2.12	5.26	5.25	10.85	11.20	14.78	9.71	7.56	68.58
1927 ..	4.71	4.44	3.62	5.04	7.15	6.95	9.40	11.67	9.11	6.13	5.64	7.21	81.07
1928 ..	4.22	.69	2.31	2.02	.67	5.75	8.07	8.66	7.36	9.13	8.42	5.94	63.24
Grand Total ..	183.45	101 32	123.98	126.75	231.65	515.44	588.30	643.74	491.53	449.96	477.51	322.79	4,261.35
Average for 67 years ..	2.73	1.51	1.85	1.89	3.45	7.69	8.78	9.61	7.38	6.71	7.11	4.82	63.60